American Artisan and Hardware Record

Sheet Metal Work-Warm Air Heating

Vol. 94, No. 5 — CHICAGO, JULY 30, 1927 — $2.00 Per Year

HORSE HEAD ZINC

First Choice on Another Prize Home

Lehigh Portland Cement Company Prize Home, Kansas City, Mo. All sheet metal work made from Horse Head Zinc and installed by Magnuson and Trieb, Kansas City, Mo.

MAGNUSON & TRIEB
FURNACES INSTALLED
SLATE AND TILE ROOFING A SPECIALTY
Kansas City, Mo. Jan. 4th, 1927
New Jersey Zinc Co.
160 Front Street
New York City
Gentlemen,
Our past experience with "Horse Head" zinc has proven very satisfactory.
The last job we did was the Lehigh Portland Cement Co.'s Prize Home, in which zinc was used exclusively.
We can highly recommend Horse Head zinc for all exterior metal work.
Yours very truly,
MAGNUSON & TRIEB.
New Jersey zinc

BUILDING experts chose *Horse Head Zinc* for all sheet metal work on the new Lehigh Portland Cement Company Prize Home at Kansas City, Mo.

Horse Head Zinc was specified to assure rust-proof, stainless, repair-free and permanent service at the lowest possible cost.

Are you familiar with this permanent, easy-working metal? The coupon will bring you a sample.

All standard shapes and sizes of Horse Head Zinc conductors, gutters and fittings are made and distributed by the following fabricators.

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KLAUER MANUFACTURING CO. . . Dubuque, Ia.
HOLBROOK, MERRILL & STETSON . San Francisco, Oakland and Los Angeles, Cal.
SHEET METAL MANUFACTURING CO., Inc. Brooklyn, N. Y.

The New Jersey Zinc Company
160 Front Street - New York City

THE NEW JERSEY ZINC COMPANY
160 Front Street - New York City

Please send me a sample of Horse Head Zinc so that I can test its easy working qualities.

NAME _____

ADDRESS _____

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A A

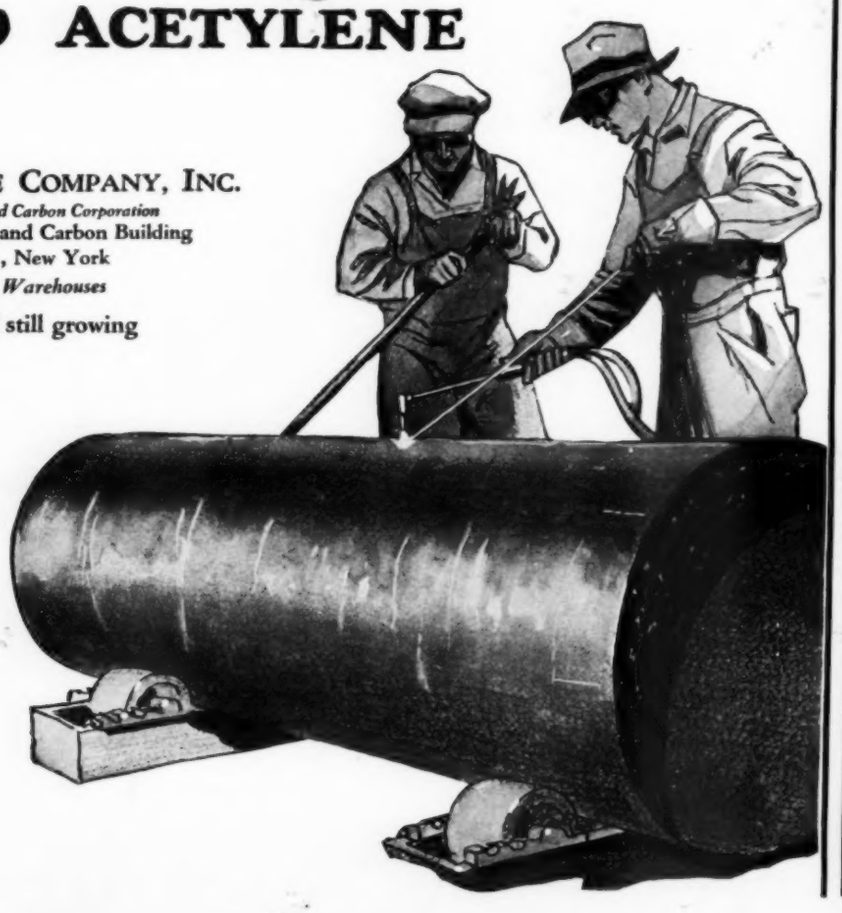
Large jobs and small— *by oxwelding*

The modern cement kiln is an industrial mammoth 8 ft. in diameter and 125 ft. long and made of heavy $\frac{5}{8}$" steel plates. It can be completely constructed by the oxy-acetylene welding process, and those so made are giving exceptionally good service. By the same method the tiny contact wires of a radio tube are joined together.

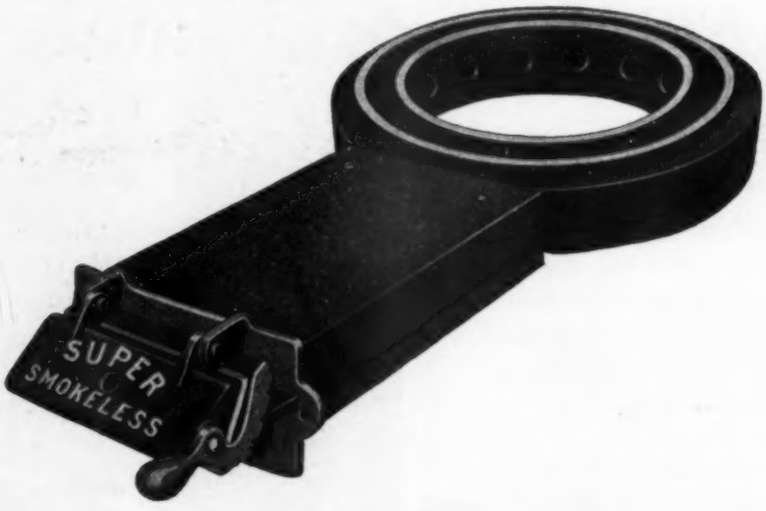
No other process of construction works so satisfactorily under different conditions. The kind, the analysis and the thickness of the metal to be welded may vary widely. The type of construction may be rugged or delicate, approximate or precise, yet the oxy-acetylene process is so flexible that it is easily adapted to every special need.

Prest-O-Lite dissolved acetylene is the original commercial welding gas. Because of it, much of the remarkable development of oxwelding and cutting has been possible.

Prest-O-Lite
DISSOLVED ACETYLENE



THE PREST-O-LITE COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
General Offices: Carbide and Carbon Building
30 East 42d St., New York
31 Plants—101 Warehouses
22 years old and still growing

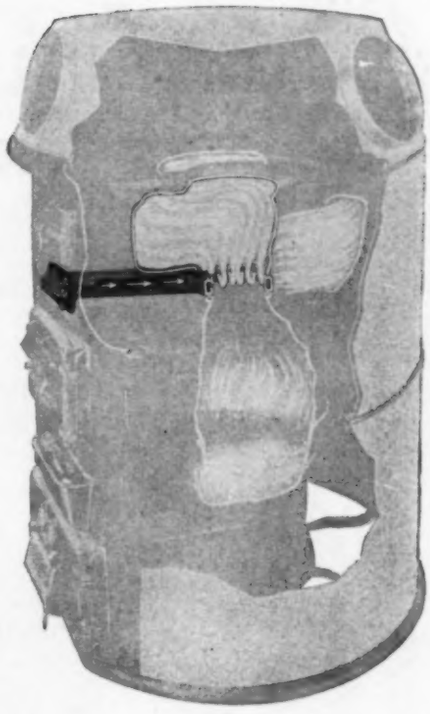


This is the *Carburetor*

Placed between the combustion dome and the radiator of the SUPERIOR SUPER-SMOKELESS Warm Air Furnace, it performs a seeming miracle! It draws air from outside the furnace, heats it, and then mixes this air with the unburned gases and smoke that rise from the burning coals.

Result—a *second* fire. No waste gases, *no smoke*, even with soft coal, and *more heat* with less fuel.

This furnace has proved itself a remarkable seller because dealers can *demonstrate* its double combustion and its unequalled thermal efficiency!



Utica Heater Co., Utica, N. Y.
365 E. Illinois St.---Chicago, Ill.

Makers of Superior Pipe and New Idea Pipeless Furnaces

Any dealer interested in *materially* increasing his furnace sales *at a good profit*, will do well to write us for full information on SUPER-SMOKELESS Furnaces—as well as our complete line. Our Sales Demonstration Plan will greatly assist in building up your business.

SUPERIOR DEALERS ARE EXCEPTIONALLY LOYAL --- WHY?

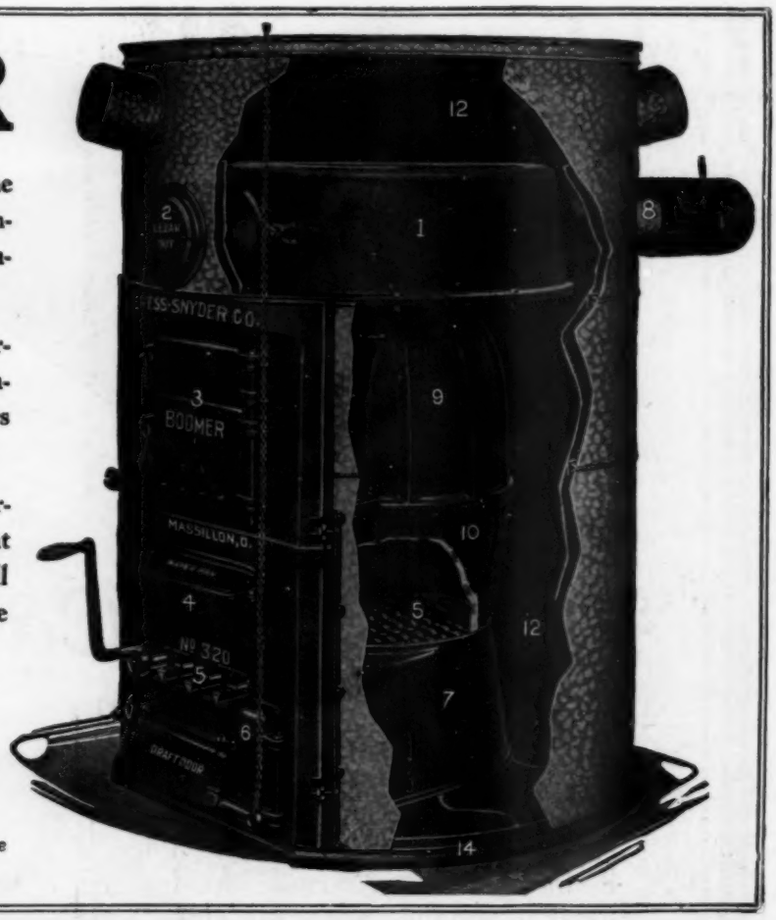
Published Weekly by American Artisan and Hardware Record, Inc., 620 South Michigan Avenue, Chicago, Illinois.
Entered as Second Class Matter June 25, 1887, at the Post Office at Chicago, Illinois, under act of March 3, 1879.

BOOMER

THIS is our latest addition to the Boomer line. We heartily recommend it for your favorable consideration.

The severe tests we have given this furnace have proven its durability. The unsolicited reports we received from users last winter have been most flattering.

For durability, economy, easy to operate, easy to set up and the low price at which we offer this furnace, you will make no mistake in arranging for the agency.



THE HESS-SNYDER CO.

MASSILLON, OHIO

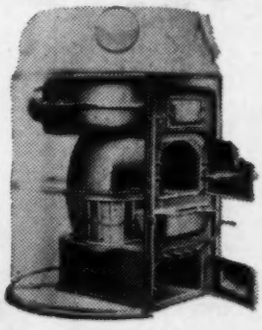
Makers of BOOMER FURNACES for Forty-Three Years

Meeting the Needs of the Western Furnace Dealer

YEAR after year "Standard Line" dealers multiply in number and increase their percentage of the available business. This is mostly due to the completeness of "Standard Service."

For Instance: From what other source can the Western Dealer obtain such complete selection of modern Warm Air Heaters as the Nesbit; Weir and Stanco Furnaces, 9 styles, and 47 sizes, in all.

Nesbit Moist Heat Furnace



Where else can you send an order for all of the following national brands and be assured of having your order filled complete?

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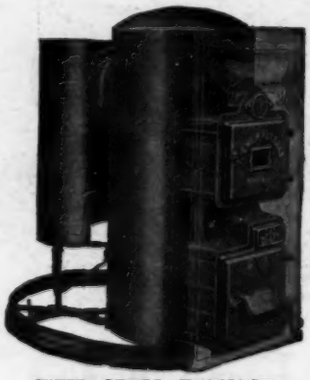
WISS SNIPS
PEXTO TOOLS
MAJESTIC CHUTES AND REGISTERS



WEIR STEEL FURNACE

Also the staple lines such as steel and semi steel Registers; Wood Grille; Whitney Tools; Asbestos Paper and Paste, etc., etc.

In fact we have everything for the Furnace-man.

STANCO STEEL FURNACE

STANDARD FURNACE & SUPPLY CO.

OMAHA, NEBR.

The Famous Three-way Air Blast

Smoke Consumer

An Exclusive Feature of—

THE PIPE AND ATH-A-NOR PIPELESS FURNACE

THIS feature, found only on the ATH-A-NOR and a built-in part of the furnace, not just a "selling" appliance, means more efficient heating.

This patented design allows an additional supply of oxygen at the exact points where it is needed and in an even and sufficient manner.

The extra supply of oxygen combines with the combustible elements and produces clean, hot flames, consuming the heavy smoke and soot, and generating more heat.

Your customers can burn soft coal economically with the ATH-A-NOR.

They can get more heat and get it quicker, and without smoke.

RIGHT now you need better furnaces to get the business.

ATH-A-NOR and SOLID COMFORT furnaces are high grade, well made, and efficiently designed furnaces.

They are built to give solid satisfaction, yet priced to meet the present day requirements of good quality at fair prices.

Let us tell you about the agency—write for full details

The MAY-FIEBEGER FURNACE CO.

Newark, Ohio

Making a big hit because it has these features--

1. Made of Toncan Copper Mo-Lyb-Den-Um Iron
2. Designed in accordance with the new Rating Formula—Twenty-two and One-half inches of Radiating Surface to every square inch of Grate Area.
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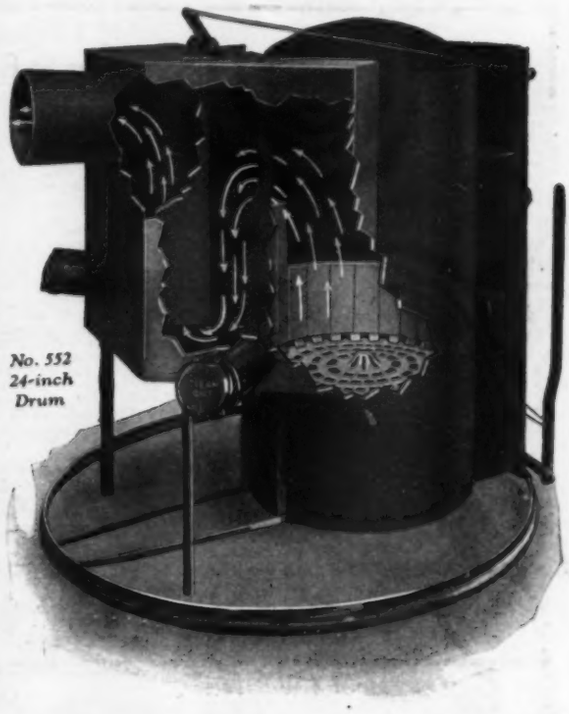
4. Patent Dumping Device
5. Electric Welded Throughout
6. Radiator Supported Independently
7. Shipped with Front Assembled
8. Capacity of No. 544—24" Drum, 635 square inches of Pipe Area.

THE Robinson Furnace is a new furnace—a heating plant that meets the demand for quality and service. Get acquainted with our dealer proposition NOW.

The A. H. ROBINSON CO.

MASSILLON, OHIO



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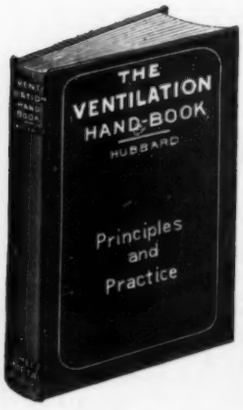
ROBINSON *Steel Furnace*

THOUSANDS have perfected their training and increased their efficiency and earnings by reading these *easy-to-read* books on SHEET METAL WORK



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A PRACTICAL book designed to cover the principles and practice of ventilation as applied to furnace heating; ducts, flues and dampers for gravity heating; fans and fan work for ventilation and hot blast heating by means of a comprehensive series of questions, answers and very plain descriptions easy to understand. By Charles L. Hubbard.

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IT contains solutions of individual pattern problems in every department of sheet metal work, giving the complete methods of laying out all forms of work. It covers every detail from the selection of tools, through Linear and Geometrical Drawing, to development of Difficult Problems by Triangulation. This revised edition contains a series of automobile patterns. These include laying out guards, fenders, cowls, skirts, hoods, etc. It has 514 pages, 895 illustrations and diagrams, measures 9x12 inches and is cloth bound.

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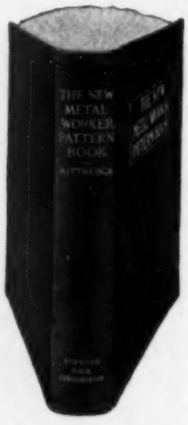

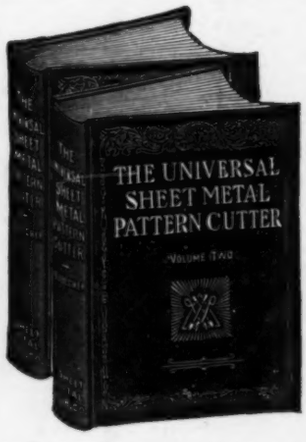

Every Sheet Metal worker should own this 2 Volume Encyclopedia of Sheet Metal Working

THE most practical and useful treatises on the subject.

Work of all the branches of the trade and the broadest scope of details are found—inside and outside work—small jobs and the most complicated are shown, explained and profusely illustrated.

The first volume deals with all types and kinds of inside small and large sheet metal work.

The second volume deals with the more advanced branches of sheet metal work, in fact is largely devoted to the architectural end of the business. It consists of 400 double column pages and is illustrated with 711 engravings showing all methods under treatment, as well as perspective views of the subjects of the patterns, and other demonstrations in their finished state. It includes drawing, full sized detailing and lettering, development and construction of all forms of sheet metal construction work.

The volumes are bound in heavy cloth and each measures 9x12 in. Each contains over 380 pages and 680 original drawings. **Price each.....$7.50**

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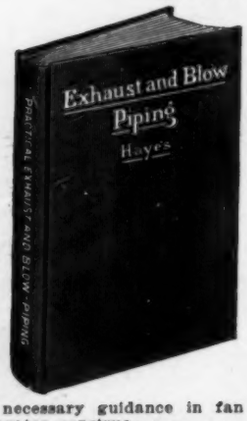
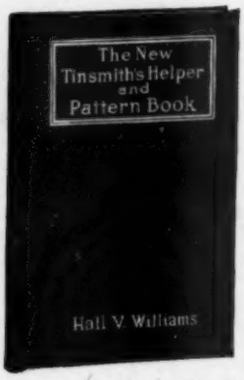
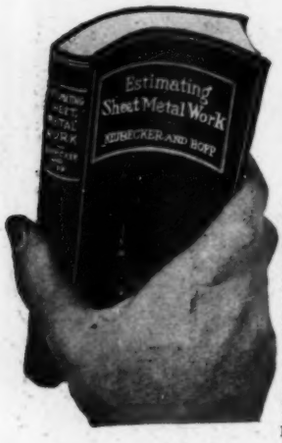


EXHAUST and Blow Piping has had an unusually big demand. A fresh supply is now off the press and is in our hands for immediate delivery. It has an invaluable treatise on the planning, cost, estimation and installation of fan piping in all its branches, giving all necessary guidance in fan work, blower and separator construction. 159 pages, 5 x 8. 51 figures. By Hayes. Cloth **$2.00**



THE NEW TINSMITH'S HELPER AND PATTERN BOOK

A NEW edition of one of the most popular books on tin-smithing and elementary sheet metal work. The contents of this new edition are new excepting the chapter on Mensuration, which has been re-arranged and amplified, and possibly some fifty pages of problems and tables which are classified to the phase of the work they cover. This book covers simple geometry and every phase of modern pattern cutting, from the making of every type of Seam, Lap and Joint, to Conical Problems and Tinware, Elbows, Piping, Ducts, Gutters, Leaders, Cornice and Skylight Work and Furnace Fittings. 352 pages, 247 figures and 165 tables, flexible leather bound and measures 4½x5 inches. By Hall V. Williams. **Price..... $3.00**

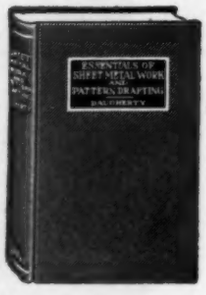


ESTIMATING SHEET METAL WORK

ANOTHER good book by Wm. Neubecker and A. Hopp. This is a new edition. A manual of practical self-instruction in the art of pattern drafting and construction work in light and heavy-gauge metal, including skylights and roofing, cornice work, etc. 417 pages; 4½x7 in.; 215 figures. Cloth. Price **$3.00**

ESSENTIALS OF SHEET METAL WORK AND PATTERN DRAFTING

A BOOK produced by the combined efforts of L. Broemel and the late Professor J. S. Daugherty, instructor in Sheet Metal Work at the Carnegie Institute of Technology. Pattern drafting is its biggest feature; not only tells how to make the pattern, but how to develop it with modern machines and tools; gives valuable assistance on soldering, brazing, welding, crimping, beading, straight, circular and irregular cutting. Bound in leatherette; 500 pages; more than 400 pen drawings and illustrations. Price **$2.00**



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NOTE

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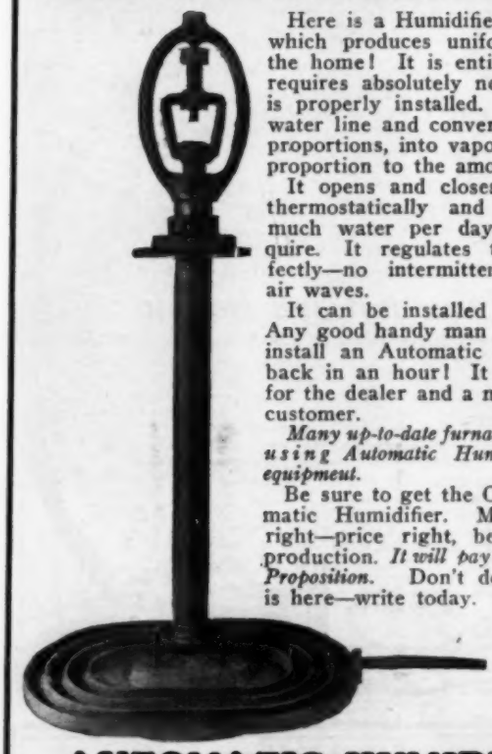
Automatic Humidifier



Here is a Humidifier or Air Moistener which produces uniformly moist air in the home! It is entirely automatic! It requires absolutely no attention after it is properly installed. It hooks into the water line and converts water, in proper proportions, into vapor and delivers it in proportion to the amount of heat.

It opens and closes—regulates itself—thermostatically and will vaporize as much water per day as conditions require. It regulates the humidity perfectly—no intermittent dry and moist air waves.

It can be installed in a few minutes. Any good handy man can leave the shop, install an Automatic Humidifier and be back in an hour! It is a money-maker for the dealer and a money-saver for the customer.

Many up-to-date furnace manufacturers are using Automatic Humidifiers as standard equipment.

Be sure to get the Only Genuine Automatic Humidifier. Made right—quality right—price right, because of quantity production. *It will pay you to get our Dealer Proposition.* Don't delay — the season is here—write today.

Get Our Proposition to Dealers

Write Us Today

AUTOMATIC HUMIDIFIER COMPANY, Cedar Falls, Iowa

A Sad Tale!

The chain looked strong—the stranger went close to the dog—the dog got excited—made a heavy lunge—the chain parted and you can see what happened.

What's that got to do with furnaces? Just this—looks are sometimes deceiving—you can sell a customer a furnace on appearance, but its real worth is determined in actual use under severe conditions.

"AFCO" Boiler Plate Furnaces perform just as good inside the casing in the home as they look without the casing on your floor.

In severe weather when all furnaces must stand the heaviest firing that's when the "AFCO" proves its superior design and construction while the inferior furnace fails. Every owner quickly becomes a friend and booster for the dealer who sells him an "AFCO."

Let us tell you more about this exceptional furnace. Write for full information and the unusual "AFCO" Dealer Plan. Address American Furnace Company, St. Louis, Mo.

Other Furnaces Come and Go, but "AFCO" Stays and Grows

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THE CLEVELAND CASTINGS PATTERN COMPANY
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FOR STOVES AND HEATERS FIRST-CLASS IN WOOD and IRON
VEDDER PATTERN WORKS ESTABLISHED 1835 TROY, N. Y.

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Ask your ticket agent or tourist agency for tickets via C & B Line. Your rail ticket is good on our steamers.

The Cleveland and Buffalo Transit Co.
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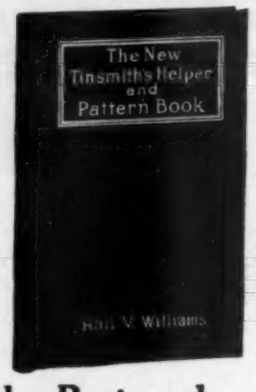
352 Pages
247 Figures
165 Tables



Flexible Leather Binding
Measures 4½x5 in.

One of the Best and Most Popular Books

on tinsmithing and elementary sheet metal work. This is the latest edition and the contents are new excepting the chapter on Mensuration, which has been re-arranged and amplified, and possibly some fifty pages of problems and tables which are classified to the phase of the work they cover.

This Book Covers Simple Geometry and Every Phase of Modern Pattern Cutting

from the making of every type of Seam, Lap and Joint, to Conical Problems and Tinware, Elbows, Piping, Ducts, Gutters, Leaders, Cornice and Skylight Work and Furnace Fittings.

In fact an excellent all-around book for every man in the trade. Mr. Williams writes in an easy-to-read, helpful manner, giving you all the necessary details about each subject he handles.

You should add this widely read book to your collection now.

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New Standardized

STYLE B

Baseboard Register

NOT only made throughout in accordance with the rules of the Standardization Committee but it is the *neatest* durable register ever made to sell at a popular price.

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8x10	inch	2¼	base	extension
8x12	"	2¼	"	"
9x12	"	2¼	"	"
10x12	"	3¼	"	"

Study the features of this new register.

Write today for full particulars and prices on the Walworth New Standardized Style B Baseboard Register.

Order some for that next job—your customers will want them.

Made by the makers of Walworth Double Gratings, Semi-Steel Registers, Side Wall and Floor Registers, Ventilators, Borders and Casings Rings.

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PENN TINSMITH'S SUPPLY CO., Philadelphia, Pa.

WE BELIEVE

that every warm air furnace improperly installed means a dissatisfied customer and reacts unfavorably on the entire warm air furnace industry and on every man engaged in making, selling or installing furnaces. Therefore

WE URGE ADHERENCE TO THE CODE

and we make and sell fittings that are worthy of the Code and the Industry of which we are a part.

F. MEYER & BRO. CO.

PEORIA ILLINOIS

The Handy Pipe People

Founded 1880

Published to Promote Better Warm Air Heating and Sheet Metal Work

American Artisan and Hardware Record

Sheet Metal Work-Warm Air Heating

Yearly Subscription Price:
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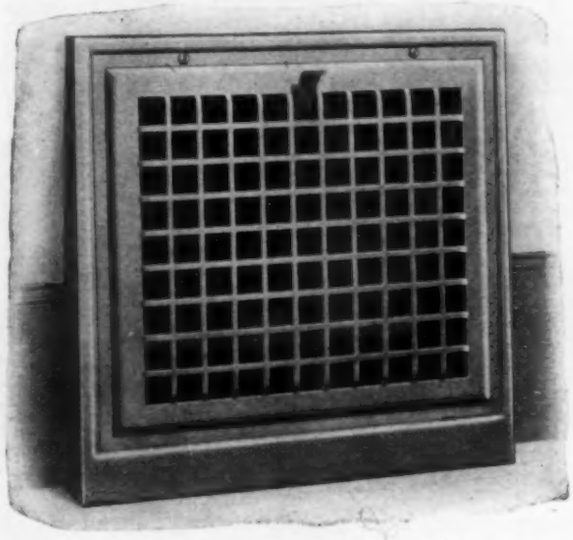
In This Issue

In this issue of American Artisan, *page* 191, *there appears the first of a series of furnace "Data Sheets," prepared by L. W. Mills, who is known to be one of the best posted men in the industry. These "Data Sheets" are simple, connected as to subject and sufficiently complete to enable any furnace installer to do good work in workmanship and design. Don't fail to read these and save them.*

T&B Register Finishes are Knockouts!



A fast selling Baseboard Register, Style 901. A real knockout in *Tanvory* or one of the *Tanbo* finishes.

YES, sir, sales resistance goes down for the count when you're handling T&B Registers. For T&B Registers battle objections to a finish—and it's the finish that wins the bout.

The new line of finishes in which T&B Registers are offered has proven a real sales factor. They make the register an additional touch of beauty to the room in which it is installed. Furnace men know what this means to their customers and, consequently, choose the T&B line.

Dealers who have not investigated *Tanbo* and other exclusive T&B finishes are losing time—and profits. Our 80th Annual Catalog has just come off the press. It shows actual T&B finishes and a mint of other valuable information. Have you received your copy?

TUTTLE & BAILEY MFG CO.

Established 1846

441 Lexington Ave. New York City

REGISTER CAPACITY

Exhaustive tests conducted by the National Warm Air Heating and Ventilating Ass'n, have established that a register gives 100% capacity if the fretwork in its face DOES NOT EXCEED 30% of the opening size. Thus T&B Registers and Faces are designed to give 100% capacity — and they do!

AA 7-30-27

TUTTLE & BAILEY MFG. CO.,
441 Lexington Ave., N. Y. City.

Please send me full particulars regarding T&B Finishes and Registers.

Name .....

Address .....

For Toncan Dealers Only

THE SATURDAY EVENING POST
Through the Years
This Super-Iron Resists Rust and Corrosion
Pure iron, scientifically combined with copper and mo-lyb-den-um, yields a resistance to rust and corrosion never attained before in a commercial iron
TONCAN Copper Mo-lyb-den-um Iron is a metallurgical achievement. It makes a super-iron of Toncan—the iron that has already proved its durability through long years of service.
There are many uses for this Super-Iron. Leading architects specify Toncan Copper Mo-lyb-den-um Iron for sheet metal work, such as cornices, ventilation ducts, skylight frames, roofing, sidings and other places where long durability is the prime consideration.
In the home, Toncan is recommended for furnaces, furnace piping, spouting and flashing by reliable sheet metal contractors. They have found it the most economical metal from the owner's standpoint.
For refrigerators, stoves, washing machines and other household appliances subjected to heat, cold or water, the use of Toncan Copper Mo-lyb-den-um Iron is a guarantee of long life. Oven and refrigerator linings resist rust indefinitely when made of this super-iron. And Toncan Enameling Iron, on account of its uniformity, improves the quality and lowers production costs of enameled products.
Write for the new Toncan Book, "The Path to Permanence." It gives complete information on this Super-Iron.
ACATHON STEELS
REG. U.S. PAT. OFF.
TONCAN
COPPER
Mo-lyb-den-um
IRON
CENTRAL ALLOY STEEL CORPORATION, Massillon, Ohio

ONLY dealers of Toncan Copper Mo-lyb-den-um Iron will profit from this extensive advertising in The Saturday Evening Post. Every four weeks a Toncan advertisement appears on the page facing the inside back cover of The Saturday Evening Post telling the public of the advantages of this super-iron. This advertising campaign means a ready acceptance of Toncan Copper Mo-lyb-den-um Iron by the purchaser and complete confidence in the sheet metal contractor who specifies it.

If you are not using and recommending Toncan Copper Mo-lyb-den-um Iron, write for complete information and tested selling helps.

REG. U.S. PAT. OFF.
TONCAN
COPPER
Mo-lyb-den-um
IRON

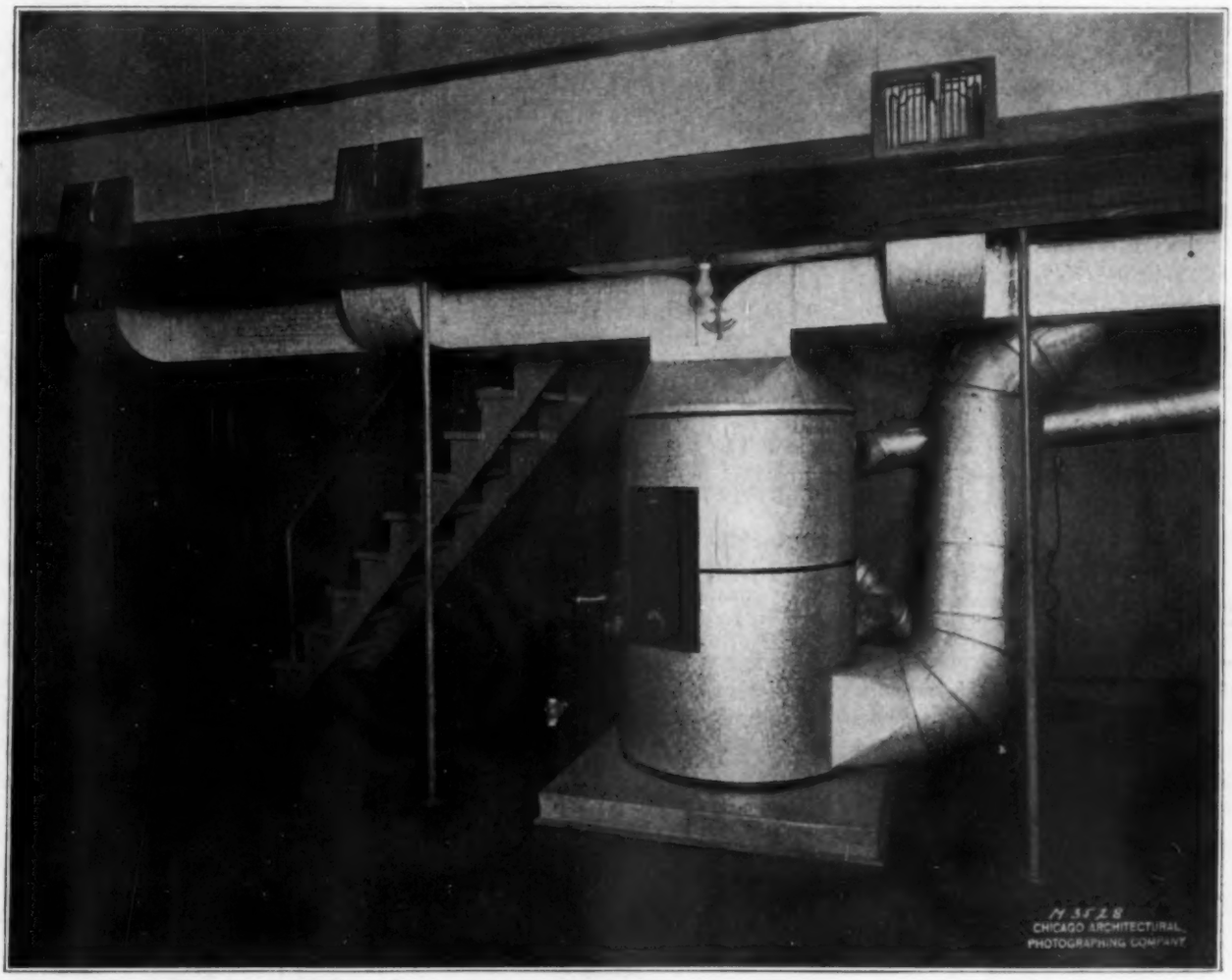
CENTRAL ALLOY STEEL CORPORATION, MASSILLON, OHIO

Cleveland Detroit Chicago New York St. Louis San Francisco
Syracuse Philadelphia Los Angeles Tulsa Cincinnati Seattle

WORLD'S LARGEST AND MOST HIGHLY SPECIALIZED ALLOY STEEL PRODUCERS

American Artisan and Hardware Record

Vol. 94. CHICAGO, JULY 30, 1927 No. 5.



Oil-Burning Warm Air Furnace Installed in the Show Room of the Robinson Furnace Company, 205 West Lake Street, Chicago, Illinois

Robinson Furnace Co. Installs Furnace in New Show Room Display

Equipment Is Oil-Burning and Arranged So as to Permit Firing

THE accompanying illustration is that of the new show room display of the Robinson Furnace Company, Chicago.

The display consists of a trunk line system with gas as fuel, together with a booster, which is hidden by the cold air return shown in the picture.

The furnace is a G-24, gas-burning furnace, having a maximum capacity of 80,000 B.t.u. The warm air outlet is 24 inches square and serves trunk lines each 10x24 inches, which are reduced later to 10x13 inches. The outlets to registers are 10x13 for double headers and 5x13 for single headers.

There are two 18-inch diameter cold air returns, one of them being concealed by the furnace casing.

There are four warm air registers, each 11x13 Hart & Cooley, and there are two 12x30 H. & C. steel cold air faces. The cold air returns are connected to special pans at the joist of lines and with transition shoes at the furnace. All outlets are equipped with quadrant dampers. The fuel supply is thermostatically controlled with an electric gas valve and pilot light, and the heater itself is constructed of Armco iron as close inspection will reveal.

The booster installed with this outfit is a No. 50, Style A, which is fully described and illustrated in a new circular which they have just gotten out. All blowers and motors are specially designed for these boosters and the company makes a point that the installation of this system in the home makes it a playground for the children in the winter time, say officials of the company.

The company is selling oil equipment in addition to gas, and in view of the fact that both oil and gas systems operate automatically, they are being marketed as the Robinson Automatic Heat Machines.

This installation has just been completed, including the stairway to a balcony where people can see the registers and cold air returns just as they would in a home.

Gray & Dudley Company Exonerated in Court Fight With Estate Stove Company

The Ohio Plaintiff Must Pay the Court Costs of the Case by Judicial Decision

GRAY & DUDLEY CO., Nashville, Tennessee, in manufacturing and selling their Washington Home Furnace entered into no unfair competition with the Estate Stove Co., of Hamilton, Ohio, and the "Heatrola," and are, therefore, liable to no part of the claimed $1,000,000 damages sought by that company, Judge John J. Gore decreed in dismissing the case that ranks with the largest in the court's history, according to a statement published in the *Nashville Tennessean.*

Judge Gore in his decision points out that no question of patent infringement of trade mark was claimed, leaving the claims solely upon the basis of "unfair competition." His ruling exonerates the Gray & Dudley Co. entirely of using the national advertising campaign of the Estate Stove Co. and the designs and inventions in such a way as to give "unfair competition."

Plaintiff Must Pay

The Ohio plaintiff must pay the costs in the case in view of the fact offered the court, his decree decides.

The Gray & Dudley Co. in its defense claimed that they manufactured the heaters on the plan of the Estate Stove Co. when the public opened a demand for that type of heater, and that even if the stove was copied in detail that the plaintiff could have insufficient grounds for damages from the local foundry plant.

Judge Gore ruled that the defendant had a right to take advantage of the demand of the buying public to manufacture such stoves even if such a demand had been created by the plaintiff.

"The only thing is that they have no right to steal good will attaching to plaintiff's personality, the benefit of the public's desire to have goods made by the plaintiff," according to Judge Gore's opinion.

He declared that the purchase of such valuable and important items as a furnace would cause the buyer to closely investigate the manufacturer of the article and his reputation and examine the furnace closely, thus assuring the public that no effort could be successful to leave the impression that the Estate Stove Co., manufactured the article instead of the Gray & Dudley Co. The proof showed that the words "Washington Home Furnace" were plainly engraved on the heater with the name of Gray-Dudley Co., Nashville, Tenn., thus making it easily determined that the local company manufactured it.

Heater Made First

The Gray & Dudley Co. showed that because of the demand the cabinet heater was first manufactured and then the "Washington Home Furnace" developed and given a wide advertising program by the Gray & Dudley Co. and sold as the product of that firm and in no way connected with the Estate Stove Co. "Heatrola." The defendant company pointed out that 14 other manufacturing concerns were making the same type cabinet heater when the local company stated and that at the time of the trial over 75 manufacturers were making the same type stove.

Judge Gore ruled that "competitive only unfair where defendant attempts to palm off on the buying public his goods as that of the plaintiff, declaring that Gray & Dudley made special efforts to declare the goods their own product, label them as such, and sell them as the product of the Nashville company exclusives, as admitted by the plaintiff.

The contention of the Estate Stove Co. showed that they started the manufacture of stoves in 1905, inventing and developing the cabinet heater in 1921 and by a national advertising campaign costing about a half million, increased their sales from 5,000 in 1921 to 18,900 in 1926. They claim the patents on the general model of 1921 proved their invention of the new type and that their slogan was "No, It's Not a Phonograph," while the Grey & Dudley Co. slogan was, "No, It's Not a Victrola." The plaintiff charged that in copying the outside cabinet of the stove as to dimensions and colors and material and shape, that the Gray & Dudley Co. left the impression with buyers that they were getting the "Heatrola" known from national advertising campaigns, and that, therefore, they were being subjected to unfair competition.

Heat—Conducted, Convected and Radiant

By L. W. Milles*

HEAT exhibits itself in three forms, Conducted, Radiant and Convected. Conducted heat, for example, travels from one end of a poker in a fire to the opposite end. Some objects transmit heat more readily than others. The furnace installer is not greatly interested in "Heat by Conduction."

Radiant heat is the kind that travels by invisible waves from a warm body. The sun's rays are the best illustration of such waves. THEY ARE NOT CARRIED BY AIR. Most of the space between the earth and the sun contains no air and is intensely cold; nevertheless, the sun's rays pass through that great space and are converted into heat after reaching the earth. The heat waves leave a warm furnace and pass through the air space in the casing without DIRECTLY warming the air it passes through on its way to, and through the casing. When these heat waves strike a substance, the substances are affected in different ways. Some absorb large quantities of heat; others reflect much of the heat just as a mirror REFLECTS light. Tin and galvanized iron reflect heat more than black sheet iron, while black sheet iron ABSORBS more heat than tin or galvanized iron. The casing of a furnace absorbs a portion of the heat, while some heat passes on through the casing. The particles of dust floating in the air inside of the casing absorb heat. The particles of moisture floating in the air absorb heat; but the air that the heat wave (radiant heat) passes THROUGH is NOT warmed by the heat wave.

When a particle of air comes in contact with a warm THING, such as a warm furnace surface, a galvanized casing, a black iron casing lining, a particle of dust or moisture in the air, the warm THING transmits heat to the air. Such heat is called "Convected Heat." The air swells exactly like a sponge absorbing water, but unlike the sponge, it becomes l i g h t e r and will rise, allowing other air to take its "place at the stove." The particle of air will in turn heat other things it comes in contact with and to some extent other particles of air rubbing against it. Heat in this form is sometimes called "Conveyed Heat."

The science of warm air heating consists in converting a large proportion of the radiant heat from a heated substance into convected heat, or heat in the air, and transmitting it to the place where warmth is required. It is also essential to PREVENT RADIANT HEAT from committing crimes.

Radiant heat will pass, more or less freely, through all substances. It is part of the furnace installer's work to prevent direct rays from passing THROUGH the surface of elbows, pipes and boots into wood or other combustible material. When the heating surface, whatever it may be, is only moderately warm it may not be dangerous. You should, however, remember that excess fires may, and do, occur and rays of radiant heat passing THROUGH boots, etc., which touch wood may become hot enough to start a fire. A smoke pipe may become very hot and do the same thing.

A knowledge, by the furnace installer, of the conversion of radiant heat to convected heat is essential. It will be referred to often in these papers.

INTRODUCTION

Six or seven years ago Professor A. C. Willard, addressing the National Sheet Metal Contractors' Association at Peoria, Illinois, reminded us that the really vital thing concerning information brought out through research work done at the University of Illinois (fostered by the National Warm Air Heating and Ventilating Association) was to bring the findings of the University of Illinois to the attention of the workman, makers, dealers.

I waited a long time, thinking some organized body would accept the challenge. Finally I decided that so far as our men were concerned I would make an effort to give them the latest data myself.

Secretary Allen Williams of the National Warm Air Heating and Ventilating Association heard of the success of my effort, and suggested that I try it in a larger way. Later I submitted papers covering our Study Club discussions on various phases of furnace installation. American Artisan *had courage to publish them.*

I have endeavored to make these "Data Sheets" simple, connected as to subject and sufficiently complete to enable any furnace installer to do good work not only as to workmanship, but in design.

I wish to acknowledge, gratefully, much help and encouragement from Professor A. C. Willard, Professor V. S. Day and Professor A. P. Kratz of the Research Staff of the University of Illinois; also to Secretary Allen Williams for valuable suggestions.

I wish also to duly acknowledge much practical help from the well-known old timer, John B. Fehlig, Manager of the Excelsior Heating Supply Company of Kansas City, Missouri, as well as "field help" and cooperation from our outside foreman, "Red" Milleson.

Signed, L. W. Millis of the Warm Air Study Club of the Security Stove & Manufacturing Company, Kansas City, Missouri.

**This is "Data Sheet" No. 1, by L. W. Millis, of the Warm Air Study Club, The Security Stove & Manufacturing Company, Kansas City, Missouri, and comprises the first of a series of articles designed to interpret the findings of the University of Illinois Research Staff on warm air heating in the language of the workman. These articles will be published later in pamphlet form.*

Research Residence Forms Basis for Intelligent Window Display

Brings Large Numbers of People Into the Store for Copies of Standard Code

WARM air furnace installers in Chicago, as well as in other sections of the country, are working overtime thinking up ways and means of getting the story about warm air heating told to their prospective customers. They are capitalizing on the research work that is being carried on at the University of Illinois by the National Warm Air Heating and Ventilating Association in a way that is astounding other merchants.

The accompanying window display of Boysens Heating and Sheet

A Warm Air Furnace Window Display Having the Research Residence as a Background. It Was Placed in the Window of the Boysen's Heating and Sheet Metal Works, 3822 North Kedzie Avenue, Chicago

Metal Works, 3822 North Kedzie avenue, Chicago, was designed to create an appreciation of warm air heating by acquainting passersby with the research work on warm air heating, being carried on jointly by the University of Illinois and the National Warm Air Heating and Ventilating Association.

It has been truthfully said that there is no advertising more valuable than that at the point of sale. Today the home owners of the country are learning of the university furnace research work through the daily press and through the great national home magazines. The use of an enlarged picture of the research residence, in the manner shown, has proven effective in tying up the dealer, with this great research work.

The enlarged picture measures four feet across. The wording on the card above the picture is "Warm Air Heating Research Residence, University of Illinois." The wording below can be easily gathered from the photograph. The card at the right explains the nature and development of the Standard Code, and how it was developed through the expensive investigational work being carried on in this great residence.

The placard near the door ties the dealer in with this code. Furthermore, at this point, near the doorway, it suggests "come in for a copy." The booklets on the platform are simply copies of the code, which can be easily read from a standing position at the window. This all has the effect of arousing curiosity in the passerby.

The window was in for six days and brought in a large number of people who wanted to take a copy of the code home with them. Each person was asked for his name and address, and was interrogated by the shop owner as to the kind of heat now being used, the age of the heater, etc. The experiment was so recent that it has been impossible to check results. The actual photograph, however, had a powerful effect in getting and holding attention. And last but not least it served as a change from having a heavy furnace always on display.

The photograph was entered in the window display competition recently conducted by the Travelers' Auxiliary of the Illinois Sheet Metal Contractors Association.

William Brown Tells How Quality Warm Air System Triumphed Over Hot Water

Fuel Economy and the Insurance of Comfort Put Warm Air in Clinton, Iowa, Rooming House

IN the July 23, 1927, issue of AMERICAN ARTISAN there appeared a layout of a warm air heating installation made by Brown Brothers, 3412 North Avenue, Milwaukee, Wisconsin. In this instance warm air heating was compelled to compete with hot water and steam, which it did successfully.

Here is what William H. Brown, President of the company, has to say about the installation and how it was taken away from the hot water people. He also gives the material and labor costs on the job.

"In estimating this job," said Mr. Brown, "one thing was constantly before us: namely, to heat every room in the building to 70 degrees in the coldest weather. The building itself is of the old type, fully two stories high, with 10-foot ceilings, plenty of glass and exposure.

"The owner had been informed by reliable hot water people that this building could not be successfully heated with warm air, and he was pretty much of the opinion that a warm air heating unit would not do the trick to the entire satisfaction of all concerned.

The Brown Brothers consist of William H. Brown, President; J. C. Brown, Secretary; A. H. Brown, Treasurer. Mr. William H. Brown was formerly in charge of the heating department of C. E. Armstrong & Sons at Clinton, Iowa.

Feeling that he was not progressing rapidly enough, William H. Brown decided that he would try his own hand at the furnace installation game, and so, together with his two brothers, he entered that business in Milwaukee, September 1, 1926. The job in question is not a Milwaukee job, but was made in Clinton, Iowa.

"When we were asked to make an estimate on the job, we were informed of the statements made by the hot water folks. Of course this was all very interesting to us. Right here, however, we made our first selling point, which was that the house could be heated with warm air, and at that cheaper than the hot water people could do it.

"When we figure a warm air heating job we always use the Standard Furnace Code. In addition to this we also make use of our own valuable information and experience, and we have had some excellent results. Incidentally, my advice to young warm air furnace installers who have not had much experience in furnace installation work is to follow the Standard Furnace Code.

"Our foremost principle is to sell a customer on service and results. We get the customer's confidence by impressing upon him the fact that we know our business and that in dealing with us he is assured of a square deal. In other words, we try to get the customer to see the proposition in the terms of what

returns he is going to get from the investment, instead of how much it is going to cost him. Price then becomes a secondary consideration. These tactics we employed quite successfully in the case of the rooming house job shown in the instance of the issue of AMERICAN ARTISAN for July 23.

"The plans shown in that article were drawn up in accordance with the Standard Furnace Code. There were three estimates handed in on the job—one having a 28-inch furnace, costing $475.00; another having a 28-inch furnace, costing $550.00; and the third, our own bid, with a 33-inch Carton furnace, costing $735.

"The first thing we did was to make a scale drawing or plan of the house, showing the location and size of every register and pipe, also the location of the furnace

"Our next step was to present these plans to the owner, taking particular pains to explain to him why we located the registers in certain parts of the rooms, why we employed different sizes of pipe, and why we located the cold air register as we did.

"Then, of course, we endeavored to show the owner why he should consider nothing but a furnace of quality, and why we were using a 33-inch furnace, while the others were only intending to put in 28-inch furnaces.

"This procedure gave the owner an idea, and he immediately requested the competitors to make similar layouts, which he used as a basis of comparison. That is exactly the end to which we had been working and we knew from then on that the job was ours. It did not take long for the owner to find the discrepancies in our competitors' plans, and he was soon convinced that he was getting the most from us for his money. A house heated to his own satisfaction with the utmost economy of fuel.

"I am giving in detail the two main warm air leads, and the location of the cold air, because the successful operation of the job depended upon the balance of these runs. These runs are the shortest and the longest on the job.

"The short run to the front porch required a 16-inch pipe. The rear rooms supplied through the long run required a 14-inch pipe for total capacity. We used a 14-inch lead on the short run, and a 16-inch lead on the long run. This arrangement gave us very good results, with the heat being evenly distributed.

"We ran a 24-inch cold air duct from the front hall, which took care of the second floor requirements, with the exception of the rear end of the house. From the second floor rear hall we dropped a 16-inch cold air to the basement and connected it with an 18-inch cold air from the rear lower floor and continued this back to the furnace with a 24-inch pipe. This pipe had a partition part way to prevent the reversing of the air.

"From the middle room on the first floor we took another 24-inch cold air back to the furnace. When all of the rooms were occupied and all of the doors were closed, we had no trouble in heating each room to 70 degrees in the severest kind of weather.

"The furnace was located in the front part of the basement, in order to favor the windward side of the building. A 28-inch furnace would have heated the building satisfactorily, but would have required forcing during extreme weather conditions. So, in order to insure a long life to the furnace itself, with plenty of reserve, and with economy of fuel burning, we put in a 33-inch furnace.

"This job has been in operation for three winters now. It has never been fired to its full capacity. All rooms have been evenly heated, while the coal consumption has never exceeded 18 tons of soft during the heating season.

"In estimating the labor cost on this job the cutting was quite an item. The building, as I have already said, was an old one, and there were beams under every partition, with the joists mortised into the beams. All risers were concealed, which means that every beam had to be cut. There were also two stone walls in the basement through which it was necessary to cut.

The labor costs on this job were as follows:

All cutting, 5½ days at $6.00 per day	$ 33.00
Helper, 2 days at $4.00	8.00
Setting furnace and cutting letouts in casing, 1 day, mechanic and 2 helpers	14.00
Erecting cold air pipe and boxes, 2 days	20.00
Erecting warm air lines in basement, smoke pipe and chains, 3 days	30.00
Running stacks and boxes, setting registers, 2 days	20.00
Testing, 1 day	6.00
Total	$131.00
Estimated labor cost	$125.00

Job Estimate Outline

Furnace and casing	$290.00
Pipe, fittings and registers	73.94
Cold air material	46.30
Cold air faces, wood	8.00
Galvanized iron	16.50
Smoke pipe and fittings	2.56
Wire and nails	.50
Shop labor	24.00
Drayage	10.00
Car fare	2.00
Labor	125.00
Estimated cost	$598.80
Price quote to customer	735.00

"In making our estimate, we always figure the pipe and fittings and registers separately for each room. Then if any changes are required, it is much simpler to change our cost figures than it would be if the total number had been lumped. All estimates are made at regular market prices. The difference between the market and quantity purchases which we make covers our overhead.

"We find that labor is generally the sticker on these jobs. But we can overcome this very readily by watching our organization quite closely.

"We sell about 85 furnaces per season and of these about 65 are quality jobs, the remainder being contractors' run."

Los Angeles, Cal., Swings Into Line to Regulate Furnace Installation

Gas Furnace Association of Southern California Backs Movement

THE following is an ordinance pertaining to the installation of warm air furnaces in the City of Los Angeles, California. This ordinance was approved and signed by the Mayor of Los Angeles on June 24, 1927, and was published in the Los Angeles, California, *Journal* on July 1, 1927.

The fact that city after city is interesting itself in better furnace installations shows how the movement which started with the inauguration of the Standard Furnace Code is spreading through the country.

Back of the Los Angeles movement for better furnace installation practice was the Gas Furnace Association of Southern California, an association organized solely for research, to promote better heating installation practice. George Finney is the secretary and treasurer, located at 810 South Flower Street, Los Angeles, California.

Ordinance No. 58206

An Ordinance amending Sections 3, 45, 85, 85½, 86 and 87 of Ordinance No. 28700 (New Series) entitled, "An Ordinance regulating the construction, alteration, repair, demolition and removal of buildings and other structures and regulating the construction and installation of plumbing and house drainage and the installation of gas piping and fittings in the City of Los Angeles, and providing for the issuing of permits therefor," approved November 13, 1913.

The People of the City of Los Angeles do ordain as follows:

Section 1. That Section 3 of Ordinance No. 28700 (New Series) entitled, "An Ordinance regulating the construction, alteration, repair, demolition and removal of buildings and other structures and regulating the construction and installation of plumbing and house drainage and the installation of gas piping and fittings in the City of Los Angeles and providing for the issuing of permits therefor," approved November 13, 1913, be and the same is hereby amended to read as follows:

Sec. 3. FEES. The Board of Building and Safety Commissioners, before granting any permit required by Section 2 of this ordinance, shall collect a fee from the applicant for such permit of the amount or amounts as provided for in this section, as follows:

(A) Cost of Value of Proposed Work — Fee

From	$ 20.00	to	$ 75.00	$1.00
From	75.00	to	200.00	2.00
From	200.00	to	500.00	2.50
From	500.00	to	600.00	2.75
From	600.00	to	700.00	3.00
From	700.00	to	800.00	3.25
From	800.00	to	900.00	3.50
From	900.00	to	1,000.00	3.75

And for each $100.00, or fractional part thereof, of the cost or value of such construction or work in excess of $1,000 and not exceeding $20,000, twenty (20) cents.

And for each $1,000, or fractional part thereof, of the cost or value of such construction or work in excess of $20,000 and not exceeding $50,000, one dollar and fifty cents ($1.50).

And for each $1,000, or fractional part thereof of the cost or value of such construction or work in excess of $50,000 and not exceeding $100,000, one dollar ($1.00).

And for each additional $1,000, or fractional part thereof of the cost or value of such construction or work in excess of $100,000, fifty (50) cents.

(B) The Board of Building and Safety Commissioners shall, before granting a permit upon an application filed in accordance with the provisions of Section 82, Section 252 or Section 287 of this ordinance, require the payment by said applicant of a fee in the sum of seventy-five (75) cents for each class of work covered by such permit; provided that in the event a permit is issued for the doing of any of the work provided for in Section 82, Section 252 or Section 287 of this ordinance, or any or all of the same, and the work to be performed under any such permits is in or upon the same building, structure or premises, then and in that event only one permit will be required, said permit to over each class of work and the fee to be charged as is herein provided for in Section 82, Section 252 or Section 287 of this ordinance.

(C) The Board of Building and Safety Commissioners shall, before granting a permit upon an application filed in accordance with the provisions of Section 85 of this ordinance, require the payment by said applicant of a fee in the sum of two dollars ($2.00) for any and (or) all of the work provided for in said Section 85 and performed in any one building. None of the provisions, elsewhere mentioned in this ordinance, shall be construed as granting permission to perform any work specified in Section 85 of this ordinance without the payment of the above mentioned fee and the obtaining of the above mentioned permit.

(D) Any person, firm or corporation desiring to deviate from the plans and specifications, application or drawings in the construction, alteration, repair or demolition, as the case may be, which affects the structural features or the stability of the building, for which a permit has already been issued, shall make application for new permit and shall pay the same fees as hereinbefore provided, based on the entire cost of the changes, provided, that the Board of Building and Safety Commissioners is hereby authorized to permit minor changes and deviations to be made without requiring a permit, provided such changes are in conformity with the ordinance.

(E) In the case of the moving of any building or structure the fees to be collected are to be based on the total cost of the work proposed to be done, exclusive of the cost of the actual moving while on the public street, alley or other public place.

(F) The above mentioned fees do not include any other work for which a permit is required by any other ordinance of the City of Los Angeles.

If any person, firm or corporation shall commence the erection, construction, building, reconstruction, enlarging, alteration, changing, adding to, repairing, raising, building upon, moving, removal or demolition of any building or structure, without a permit first having been obtained from said Board of Building and Safety Commissioners as required by this ordinance, notice in writing to obtain such permit shall be served by said board upon such person, firm or corporation or shall be posted upon such building, and if such person, firm or corporation shall refuse, fail or neglect, for a period of twenty-four hours, exclusive of holidays, after the service or posting of such notice to obtain such permit, such person, firm or corporation shall be required, upon subsequently taking out such permit, to pay for the same double the amount of the fee hereinbefore provided for such permit; provided, however, that any failure of said board to serve such notice shall not relieve any person, firm or corporation from any liability or penalty imposed by or provided for in this ordinance.

Sec. 2. That Section 45 of said Ordinance No. 28700 (New Series) be and the same is hereby amended to read as follows:

Sec. 45. STUDDING—CLASS "D." Every stud in an exterior wall and every stud in a bearing wall in any Class "D" building not more than two stories in height shall be at least 2"x4" in cross section or may be not less than 1⅝"x3⅝" when such studs are sized and surfaced; and for any building more than two stories in height every such stud for the upper two stories thereof shall be as hereinbefore specified for two-story buildings, and every such stud in any story below the upper two stories shall be at least 2"x6" in cross section, or may be not less than 1⅝"x5½" when sized and surfaced. Every stud in non-bearing partitions shall be not less than 2"x3" in cross section, or may be not less than 1⅝"x2⅝" when sized and surfaced. No stud, plate or sill shall be notched or cut except as hereinafter provided in this section.

Studs may be notched not to exceed one inch in depth and studs underneath window openings or similar openings and the studs at one side of such openings may be notched or cut not to exceed two (2) inches in depth, and non-bearing studs may be notched not to exceed two (2) inches in depth for a total length of not to exceed six (6) feet in any twenty-five (25) foot length of a non-bearing partition; provided, however, that exterior wall and bearing studs may be notched or cut not to exceed two (2) inches in depth for a total length of not to exceed six (6) feet in any twenty-five (25) foot length of any such wall or partition, in case the studs at each side of such notching or cutting are doubled and the plate above the notched or cut studs is trussed to such double studs, in any case where more than two adjacent studs are notched or cut.

A plate at the top of a wall or partition may be notched or cut in the event that a reinforcing strip of iron or steel at least 1/16″ in thickness, 1½″ in width and of sufficient length to extend at least six (6) inches beyond each side of any such notch or cut, and securely attached to the plate by means of bolts or by means of at least two (2) 20-penny nails at each end. In case such top plate is notched or cut not to exceed 2″ in depth such reinforcing may be placed along the notched edge only. Where the notch or cut is more than 2″ in depth, or the plate is completely cut through, such reinforcing strips shall be placed on both edges of the plate. A floor plate or sill may be partially or completely cut through without reinforcing same in any manner.

All wood joists shall have at least one row of 2″x3″ cross bridging to each twelve (12) feet or fraction thereof of span. All spaces between joists shall be blocked at each bearing, and over each bearing partition, with solid blocks not less than two inches thick and the full depth of the joists.

Each stud wall and partition shall have two-inch bridging at the floor and the ceiling and one row of two-inch bridging between the floor and the ceiling; provided, however, that where two-inch plates are used, the full width of the stud wall or partition, bridging at the floor and ceilings shall not be required.

Where hot air furnace pipes or risers are to be installed in the walls, the studs, joists, plates or other construction shall be framed so as to provide not less than a 14″ clear space, continuous from the point where the riser enters the wall to the register. Studs forming the sides of the riser space shall be directly over or under joists, as the case may be, and the above mentioned requirements for blocking and bridging between joists and studs shall not apply to this space.

All corners of Class "D" buildings shall have diagonal bracing in the stud walls or partitions in each story and additional diagonal bracing shall be constructed in each stud wall or partition in each twenty-five feet of length thereof.

No studding shall be placed against the wall of another building, unless the said studding is sheathed with one-inch boards, close jointed, on the side thereof next to said adjacent building.

Sec. 3. That Section 85 of said Ordinance No. 28,700 (New Series) be and the same is hereby amended to read as follows:

Sec. 85. WARM AIR HEATING FURNACES. Every warm air heating furnace shall comply with the provisions of this section.

A "Warm Air Furnace" is hereby defined to be any heating appliance or equipment so constructed as to have a fuel combustion chamber which will heat air and which heated air can be distributed from such appliance or equipment by means of ducts or pipes.

"Warm Air Furnace Appurtenances" are hereby defined as warm air pipes and fittings, cold air or recirculating pipes, ducts, boxes and fittings, vent connections and fittings, registers, borders, faces and grilles, electrical transformers, wires, valves, switch plates and other apparatus when used in connection with warm air furnaces.

A "Gravity Heating System" is hereby defined as being a heating system consisting of a warm air furnace with heat pipes, registers and other appurtenances and depending on the natural flow of heated air, without mechanical aid, other than a booster fan, for effectiveness.

A "Blower Heating System" is hereby defined as being a heating system consisting of a warm air furnace with heat pipes, registers and other appurtenances and depending on the forced circulation of heated air by means of mechanical aid other than a booster fan.

It shall be unlawful for any person, firm or corporation to erect, place, install or relocate in any building any warm air heating furnace or any portion of any warm air heating system, or to cause or permit to be erected, placed, installed or relocated in any building any warm air heating furnace or any portion of any warm air heating system, without first obtaining a permit in writing so to do from the Board of Building and Safety Commissioners; and, before such permit shall be issued, complete plans, drawings, details and specifications necessary to show a compliance with the provisions of this ordinance with reference to warm air heating furnaces and appurtenances, shall be submitted to the Department of Building and Safety for approval. For any such permit a fee shall be paid as provided in subsection (c) of Section 3 of this ordinance.

Every warm air furnace designed to burn gas for fuel shall set upon a masonry floor, or shall set upon asbestos not less than one-quarter (¼) of an inch in thickness, covered with not less than No. 20 U. S. Standard gauge galvanized iron, or shall set upon asbestos covered mineral felt one-half (½) inch in thickness, or shall set upon not less than two (2) inches of masonry or tile on top of a wood floor; and any such asbestos and galvanized iron or asbestos covered mineral felt or masonry or tile shall extend beyond the outer walls of the furnace not less than twelve (12) inches at every point.

Every gas burning furnace installed in any building shall be installed and located in a room or space which shall be not less than six (6) feet in its least horizontal dimension, and which shall have a floor area of not less than forty-eight (48) square feet; and every such room or space shall have a clear ceiling height of not less than seven (7) feet at every point. Access to every such room or space shall be by means of a door not less than two and one-half (2½) feet wide and six and one-half (6½) feet high, and where necessary, access to such door shall be by means of a stairway. No trap door or ladder shall be allowed.

Every cellar, basement or space in which a gas furnace is located shall have a fresh air inlet through foundation walls and all intervening walls of not less than four hundred (400) square inches, independent of all doors and windows. If hardware cloth is installed over such inlets, the mesh shall be not less than one-half (½) inch by one-half (½) inch. Gas heating furnaces shall be vented in accordance with the provisions of Section 85½ of this ordinance.

Every warm air furnace designed to burn wood, coal, oil or similar fuel shall set upon a masonry floor, and every portion thereof, including the vent pipe, shall be at least two (2) feet from any wood, wood or plasterboard lath and plaster, or any other similar or combustible material; or such furnace and vent pipe may be not less than fifteen (15) inches from such materials if they are protected with one and one-half (1½) inches of metal furring covered with No. 20 U. S. Standard gauge galvanized iron, or with asbestos covered mineral felt one-half (½) inch in thickness, or with metal lath and plaster. Whenever any such furnace is set in brick the top thereof shall be completely and tightly covered with at least four (4) inches of brick concrete, tile, sand or a combination of such materials. Every such furnace shall be connected to a chimney or flue constructed as provided in Section 92 of this ordinance.

Every warm air furnace designed to burn liquid fuel shall set in a masonry pit at least six (6) inches deep below the adjoining floor levels and extending two (2) feet beyond the furnace on every side thereof.

Every lateral heat pipe, riser heat pipe, or similar pipe, and every register, box, boot or fitting therefor shall comply with the provisions of Section 87 of this ordinance.

Sec. 4. That Section 85½ of said Ordinance No. 28,700 (New Series) be and the same is hereby amended to read as follows:

Sec. 85½. GAS VENTS. Every chimney, flue, vent or vent connection for any fixture, appliance, furnace or equipment designed, intended or constructed to burn gas for fuel shall comply with the provisions of Section 92 of this ordinance for smoke chimneys and flues, or shall comply with the provisions of this section for vents and vent connections.

A "Vent Connection" is hereby defined as a pipe designed to carry the products of combustion and which runs in a generally horizontal direction from the gas appliance or furnace to the gas vent or chimney.

A "Vent" is hereby defined as a pipe designed to carry the products of combustion and which rises in a generally vertical direction from a vent connection, gas appliance or furnace as the case may be.

Every such vent or vent connection shall consist of unglazed fire clay or concrete tile pipe having sleeves or flanges, not more than twenty-four (24) inches apart, at all joints in said pipe. Such sleeves or flanges shall be so constructed and installed on said pipe that they will securely join together all portions of the same by means of cemented joints, and that they will project at least three-quarters (¾) of an inch beyond the outer surface of said pipe at every point. Such sleeves or flanges shall be

securely attached to the portion of the building or structure adjoining said vent pipe, acting as spacers to provide an air space around said pipe and to hold same in position. Or such fire clay or concrete tile vent or vent connection may be enclosed in a similar pipe or a galvanized iron pipe having every joint in any such fire clay or concrete tile pipe securely fastened together by means of a galvanized iron sleeve or flange and having every joint in any such galvanized iron enclosing pipe securely fastened together, and be so constructed and installed that the two pipes shall be rigidly separated by spacers not more than twenty-four (24) inches apart so as to provide an air space of at least one-half (½) inch between said pipes.

Every such fire clay or concrete tile vent or vent connection shall have walls, thimble openings and other portions thereof at least one-half (½) inch in thickness.

Every such unglazed fire clay or concrete tile vent or vent connection shall have a clear and unobstructed flue area equal to the area of the vent connection or outlet on the appliance or furnace. Provided, however, that such vent pipe shall be not less than twelve (12) square inches in area and the least internal dimension shall be not less than two (2) inches.

The provisions of this section shall not be deemed or construed to prohibit a single metal vent or vent connection, not less than three (3) inches in diameter, extending from the appliance or furnace to the walls, partitions, ceiling, roof or other portions of the building. Such single metal pipe shall be entirely in a room, basement, cellar or other portion of the building in general use by the occupants thereof and shall be completely exposed to view. Every portion of such metal pipes shall be at least six (6) inches from every portion of the building, or at least three (3) inches from every portion of the building in case the metal pipe is covered with three (3) thicknesses of asbestos paper having a total thickness of one-eighth (⅛) inch or in case every portion of the building within six (6) inches thereof is protected by a shield of tin or galvanized iron having a one (1) inch air space between such shield and any such portion of the building. The provisions of this paragraph shall not apply to any space under a building not directly over a basement or cellar, or to any attic or roof space or other portion of a building which is not in plain view at all times and readily accessible. Provided, however, that in no case shall a vent connection for a gas burning furnace hereinafter installed be longer than the vent to which it connects, the length of the vent to be measured from the point where the vent connection enters said vent to the top of the vent.

Every thimble or opening into any vent and every portion of a vent or vent connection extending into or through any wall, partition, floor, ceiling, roof or other portion of any building shall have a perforated and ventilated sleeve or collar which will provide at least a three-quarter (¾) inch air space at every point around same.

Every vent connection and vent shall extend and be continuous from the fixture, appliance or equipment to the outside of the building, and shall extend at least one (1) foot above the highest portion of any building or any portion thereof within twenty (20) feet of the outer end of any such vent in any horizontal direction. A down draft deflector shall be installed on every gas furnace or along the vent connection thereof, and such deflector shall be within the walls of the room or space in which the furnace is located. No damper of any nature shall be used in a gas furnace vent connection. A down draft deflector may be installed at the outlet from any other gas burning fixture or appliance.

Every vent shall have a double-deck cowl, hood or cap open on every side and having a ventilating area equal to the flue area at the outer end of the vent.

All galvanized iron constituting a part of any vent or vent connection shall be at least No. 24 U. S. Standard gauge.

Every vent connection or portion thereof shall have a rise of not less than one-half (½) inch for each foot of runaway from the fixture or appliance.

Every vent or vent connection shall be constructed and installed in a safe, secure and workmanlike manner, and so as not to be a fire hazard to the building in any way, or a menace to the health of the occupants thereof.

No gas burning fixture or appliance shall be connected to any chimney, flue or vent to which there is connected any fixture or appliance which will burn any other fuel than gas.

Every gas water heater shall have an entirely separate and independent vent, except when connected to a chimney, complying with Section 92 of this ordinance. Other gas fixtures or appliances may be connected to one vent in case the flue area of the vent is increased so as to equal the area of the vent connection or outlet of the largest fixture connected thereto, plus fifty (50) per cent of the area of the vent connection or outlet of each additional fixture connected thereto.

The provisions of this section requiring fire protection and air spaces need not be complied with when a vent or vent connection is in or adjacent to masonry, brick, concrete, tile or equally incombustible materials, but any such vent shall be of fire clay or concrete tile and comply with all other provisions of this section.

All tile shall be well made and of good materials, without cracks, checks, breaks or other defects.

Vent shall be run as nearly vertical as possible, avoiding bends and horizontal runs.

Sec. 5. That Section 86 of said Ordinance No. 28,700 (New Series) be and the same is hereby amended to read as follows:

Sec. 86. USE OF FURNACES. It shall be unlawful for any person, firm or corporation to use or maintain any heating furnace until such furnace has been inspected and approved by the Department of Building and Safety.

Sec. 6. That Section 87 of said Ordinance No. 28,700 (New Series) be and the same is hereby amended to read as follows:

Sec. 87. FURNACE PIPES, BOXES AND FITTINGS. All concealed wall pipes or risers, register boxes and fittings shall be thoroughly covered with not less than two (2) thicknesses of asbestos paper having a total thickness of not less than one-eighth (⅛) of an inch, cemented to same, and after being placed, all joints shall be covered in the same manner.

All concealed wall pipes and all first floor side wall boxes shall be provided with suitable boots extending to the under side of the floor joists and all joints between the same shall be tightly fitted together and covered as above provided; provided, however, if such concealed wall pipes, register boxes and fittings are constructed of two (2) thicknesses of metal and separated on all sides by a clear air space of not less than one-quarter (¼) inch between the inner and outer metal sheets, the asbestos coverings herein provided for may be omitted, except at the joints.

The boots at the bottom of all risers and side wall register boxes shall be attached at the time said risers and boxes are placed in the building.

All lateral heat pipes, risers, elbows, transitions, throats, boxes and registers serving the first floor above a warm air furnace shall have a free, unobstructed net area in square inches of not less than the capacity in cubic feet of the room or rooms in which the registers are located, divided by 40; provided, however, that no lateral heat pipe shall have a net area less than thirty-eight (38) square inches.

All lateral heat pipes serving stories above the first floor shall conform with the requirements for lateral pipes serving the first story. All other appurtenances used to conduct heated air such as risers, transitions, throats, registers, and similar fittings, shall have a free, unobstructed net area equal to not less than two-thirds (2/3) that required for the first story. All lateral heat pipes shall have a total rise of not less than one (1) inch for each foot of run, such rise to be measured from the top of the furnace to the point where the lateral pipe joins a riser or register and at no place shall lateral heat pipes have a downward pitch away from the furnace. No lateral heat pipe shall exceed twenty (20) feet in length except where a booster fan is used, in which case such pipes shall not exceed forty (40) feet in length. All lateral heat pipes shall be covered with asbestos air cell paper not less than one-quarter (¼) inch thick.

Provided, however, that the requirements of this section as to the size, rise and covering of lateral heat pipes, and the size of risers, elbows, transitions, throats, boxes and registers, shall not apply to a blower heating system as defined by Section 85 of this ordinance; but lateral pipes as well as risers and fittings, for such a system, shall be covered by asbestos papers as heretofore provided.

Sec. 7. The City Clerk shall certify to the passage of this ordinance by a unanimous vote and cause the same to be published once in The Los Angeles Daily Journal.

I hereby certify that the foregoing ordinance was passed by the council of the City of Los Angeles by the unanimous vote of all the members of said Council present, there being not less than twelve members present, at its meeting of June 17, 1927.

ROBT. DOMINGUEZ,
City Clerk.

Approved this 24th day of June, 1927.

GEORGE E. CRYER,
Mayor.

7—1 1t

Random Notes and Sketches
By Sidney Arnold

"The essence of humor is sensibility; warm, tender fellow-feeling with all forms of existence."—Carlyle.

A "Nawing Conshuns"

Some time ago George Robinson of the A. H. Robinson Company had his pocketbook stolen and, unfortunately, it contained a good deal of money. One day, to his great surprise, he received a letter from the thief, enclosing a small portion of the stolen money.

It read as follows:

"Sir: I stole your money. Remors is nawing at my conshuns so I send sum of it back. When it naws agin I will send sum more."

* * *

Why He Left

A lawyer called a former news reporter to the witness stand for examination. "Where did you work last?"

"St. Louis Chronicle."

"Why did you leave?"

"Editor and I disagreed on a political question of national importance."

"Before that, and reason for leaving?"

"Lexington Courier, and the editor and I disagreed on a political question of national importance."

Two more papers were named by the witness and the same reason for leaving given in both cases. The judge interfered. "What was the political question of national importance that you could never agree on?"

"Prohibition."

* * *

The Personal Touch

Arthur Lamneck, Secretary of the W. E. Lamneck Company, Columbus, Ohio, went into a store to buy a fountain pen. The young saleswoman gave him one to try and he covered several sheets of paper with the words, "Tempus fugit." You know Art is a great student of Latin. At the age of six, I am told, he had made short work of Cicero and was well on his way through Horace.

The obliging saleswoman offered him another pen. "Perhaps," she said, "you'd like one of this kind better, Mr. Fugit."

* * *

A real estate salesman of West Texas had just finished describing the glorious opporunities of that part of the country. "All West Texas needs to become the garden spot of the world," he said, "is good people and water."

"Huh," replied the prospect, "that's all hell needs."—*Texas Association Bulletin.*

* * *

Registering Rage

H. R. Harrison of Rudy Furnace Company tells me that Hollywood is still talking of the director who, wanting to get a bit of realistic anger acting from a phlegmatic actress, handed her a notice of the 10 per cent salary cut just before he began to film the scene.

* * *

Ed Stahler of the G. & S. Stove & Furnace Company is author of the statement that the current song hit, "Muddy Water," refers, it should be explained, to the Mississippi river and not to the Scotch whisky now being served in certain night clubs on the northwest side of Chicago. And take it from me, Ed knows, being one of the members of the board of the Northwest Town Business Men's Association.

* * *

For the Duration

Here's a pathetic scene enacted in the home of Harvey Manny of the Robinson Furnace Company last Sunday morning.

The family had gathered at the front door. Harvey had a sad but determined look on his face. The mother and the children, except the two-months-old baby, were in tears. Harvey tenderly kissed them one by one. Then he said: "I've amply provided for you all during my absence. I've made arrangements with the State University for the children's higher education, and I hope to be home in time to see the baby take his Master's degree. Good-by, good-by, and God bless you!" And then, with tears streaming down his face, he marched away. He was going to the public links across the road to play eighteen holes of golf.

* * *

Hopeful

The output of pennies by United States mints in the first six months of 1927 was 175,847,000. In exchange, says Charles Hall, President of the National Warm Air Heating and Ventilating Association, who is an extreme optimist, the public succeeded in extracting thirteen pieces of gum and four of chocolate from slot machines.

* * *

So Considerate!

"Are your children thoughtful of you?" asked the neighbor of Charles Roland of Roland and Beach, Richmond, Indiana.

"Oh, very," beamed Mr. Roland. "When they get home in the morning they always bring in the milk and put it in the ice box for me."

* * *

I had a very pleasant visit on Wednesday of this week from my friend F. E. Mehrings, of the Meyer Furnace Company, Peoria, Illinois, who stopped in Chicago long enough to say hello while enroute to Detroit where he will spend a few days. Mr. Mehrings had with him a very unique advertising feature which will be put into use by the Meyer Furnace Company in the very near future. A story about this feature will appear in a near issue of AMERICAN ARTISAN.

* * *

I also had the pleasure of a visit from J. C. Miles of the Warm Air Furnace Fan Company, Cleveland, Ohio, on Thursday of this week. I enjoyed his visit very much indeed.

* * *

"And what, little girl," asked the lady visitor, "are you going to be when you grow up?"

"I'sdonna be a blonde secretary," replied the innocent babe, "so's my daddy will go out with me sometimes."

The Editor's Conning Tower

It's as Easy to Aim High

THERE has never been a time, in the opinion of men grown old and wise in the ways of the world, when the opportunity for success was greater than it is today. The thing that keeps many of us from achieving an unqualified success is not lack of ambition nor lack of purpose, but rather the tendency to be satisfied with far less than the success we are entitled to under the most ordinary circumstances.

Aim high. Have the courage to see yourself many steps ahead of where you are now. Don't be satisfied with little rewards. Carve out a large goal for yourself, and go after it. There's no disgrace in falling a little short. You will be a better man for having tried than you were before.

The man who can keep before him a picture of what he wants to be is transformed from a ten-horsepower man to a hundred horsepower man. It's hard to stop a man who knows where he is going, and has his foot on the accelerator.

How are we going to know what is the best sheet metal roof if we have no ideals to guide us? We must have ideals of perfection in our work as well as in the conduct of our own personal lines. The thought in Emerson's mind when he said, "Hitch your wagon to a star," is so extremely modern and forceful that we take it as the epitome of this editorial. Read it and memorize it.

Production versus Distribution

ANALYSTS have long been making the general statement that production costs have declined while distribution costs have increased, but it has remained for a New York banking house (Dominick & Dominick) to give us some real figures.

These show that between 1870 and 1920 the cost of manufacturing has been reduced by more than 20 per cent. In the same period the cost of getting goods to ultimate consumers has increased nearly 300 per cent. What is more, in 1870 only 10 per cent of the workers of the United States were engaged in distribution; today the percentage is about 25 per cent.

As someone has said, the only great mechanical labor-saving device which has been introduced into distribution in 100 years is the printing press, meaning advertising. This contrasts with thousands of marvelous labor-saving machines which have so remarkably changed and cheapened production in America. Of course, one might say that the chain store is also a labor-saving distribution "device," but it is not a mechanical device.

At any rate, the facts are clear that we have a long way to go indeed to match the record of the factories in progress. We have, it is true, rendered far more service than in former days through modern distribution methods, but it is obvious that the turning point is reached in this snowballing process in distribution cost. It must now definitely about face and march toward lower, not higher, cost.

One Way Standard of Industry Will Be Raised

IT IS apparent that sheet metal men are awakening to the necessity of making a technical study of their business. With the colleges and universities of the country turning out technically trained engineers at a more rapid rate each year, a new form of competition is facing not the industry itself, but the individual. This new competition, however, should bring with it no cause for alarm to the established contractor who has been "learning while earning." It merely means that the industry will have available to do its work the services of men whose minds have already been trained to think in terms of mechanics. In other words, these men have already acquired the foundation upon which they can build.

The courses in apprenticeship training, the holding of conventions and meetings at the various colleges and universities shows the trend in the industry. The sheet metal man is tending to a higher type of business executive. The desire to improve is present. It is now only a question of time before the fondest dreams in this direction will be realized.

Giving Full Details When Seeking Information

IN THE course of a year there are received in the office of AMERICAN ARTISAN thousands of letters which contain requests for information on divers subjects. Many of these requests for information are answered through the columns of AMERICAN ARTISAN. Many more are answered by direct mail correspondence. Every effort is made to produce the desired information.

However, it often happens that the query department is unable to give a complete answer because of a lack of definite details from which to work.

The enviable record of forty-five years of uninterrupted success which AMERICAN ARTISAN has enjoyed has been based entirely upon the service it renders. Its only stock in trade is service. For that reason your inquiries are welcomed. But we urgently solicit your indulgence to the extent that when writing for information you give as many of the facts and details as are available to you. It will aid us greatly in running down the information desired.

Showing How to Construct Pattern for Double Angled Elbow

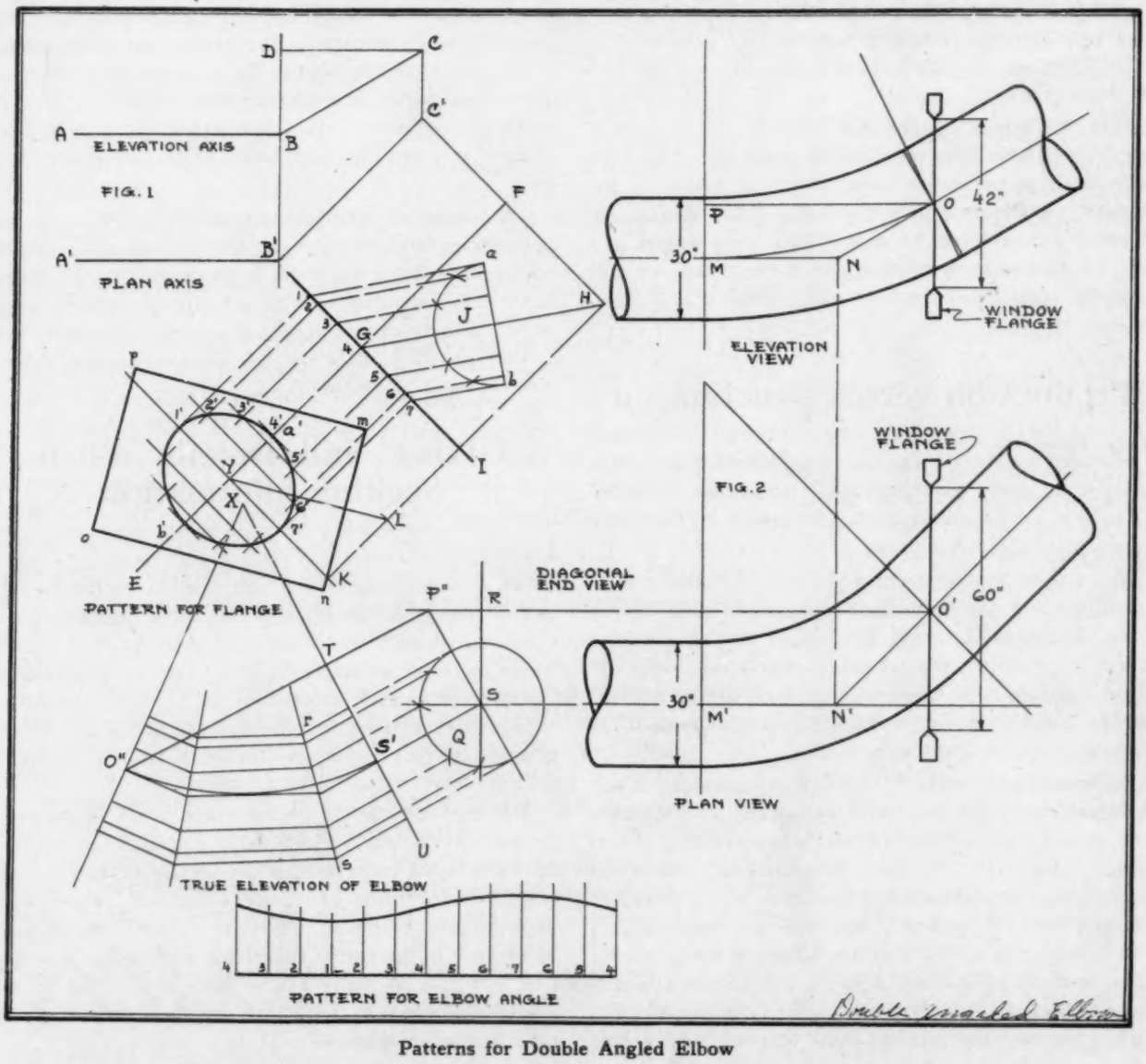
Illustration Will Assist Sheet Metal Men Who Meet With Round Pipe Problems

By O. W. Kothe Principal St. Louis Technical Institute

SHEET metal men often meet with round pipe problems such as where a pipe makes a bend in its elevation and also in the plan in the same distance. In general most men can avoid this by making rise of elevation in one place and then produce offset or bend in plan in some other place, and in that way overcome the difficulty of making a diagonal elbow. Where such pipes pass through a wall or a window in a wall it is sometimes difficult to arrive at the opening for the flange.

In general most men would make short work of it by simply whittling out sheet until the opening was arrived at, and if one sheet would be wasted, why another one would be marked out and used. But men who wish to be more accurate will find the enclosed drawing of considerable help.

In our elevation we have a rise of 30 degrees for a 30-inch pipe as the angle M-N-O indicates. Then in plan we have a bend as M′-N′-O and this gives us a double angled pipe, which must be developed from a diagonal view, in order to arrive at correct miter lines. If we project the point O′ and M′ to the left as on line R-S and describe a section Q we can place the rise R-P″ equal to the rise M-T of elevation. Then at right angles to P″-S we can



Patterns for Double Angled Elbow

square out a line and at any place draw a line perpendicular to it as X-U.

The line P″ is extended, making T-O″ equal to P-O of elevation. This will then give us the distant S′-O″ in which to strike the elbow, and which can be drawn to the apex S. After this we establish miter line r-s and then continue development as for any ordinary elbow.

In developing pattern for opening, assuming that no elbow patterns are required, we can proceed as shown in diagram figure I, where A-B-C is the elevation axis of pipe, and A′-B′-C′ is the plan axis of pipe. The elevation will have a distant of C-D in its length. Now we develop a diagonal view, drawing a line E-F parallel to B′-C′ of plan and then on the line F-H measure the length or altitude of elevation, we have the angle H-G, that the pipe must take when passing through the flange.

The flange is represented by B′-I, and so by squaring a line a-b at any point and using section J to equal diameter of pipe and dividing it in equal parts, we can project lines into flange line B′-I as in points 1-7. This then gives us the elongated shape, while the section J gives us the width of the diameters.

By drawing a line parallel to B′-I we can project lines from 1 to 7 past this line and then pick the width of lines from a-b of section J and set them as a′-b′ in pattern for flange. These lines are then drawn parallel to B′-I and the intersections 1′-2′-3′, etc., will enable you to trace the outline of flange opening. Now as this pipe passes through the flange at an angle, we can carry the point H into pattern as K, which would be parallel to E-F and then measure K-L equal to B-D of elevation.

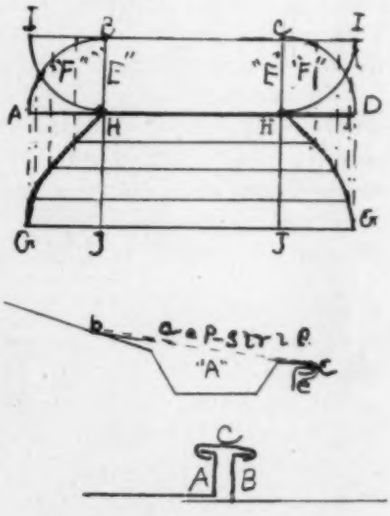
Then draw L-Y and this gives you the axis line for the perpendicular outline of the rectangular flange.. By passing lines through Y perpendicular and also parallel to Y-L, you can measure the length of flange as m-n-o-p as becomes the size to fit in the window. An edge should be allowed on inside of this opening for turning out against pipe, which enables soldering, or at least as a small water shed if no soldering is done, and it also enables closing up any little efficiency in the opening if such a thing occurs.

How to Make a Range Canopy with Flat Back and Mitred Ends

Regarding the layout for range canopy with flat back and mitered ends, requested by A Subscriber on page 103, July 15th issue, said J. D. Grace, I am submitting a rough layout to convey the idea to him.

Let A, B, C, D represent the front elevation of canopy. Divide A, B into required number of equal spaces.

Prepare stretchout H, J, setting the spaces upon it as shown. Then



Illustrating Mr. Grace's Idea

by projection or picking cross lines in stretchout corresponding with same points in front elevation. Trace line through points obtained, giving the miter cut for A, B and C, D as shown, or G, H, H, G the pattern for top and front of canopy. Pattern shapes for ends are indicated at G, H, J. The pattern for back is the same shape as front elevation, therefore is inverted as shown by I, I, H, H.

Regardless of the contour of front and ends, the principle of laying out is the same, so I hope this may be of some help to Subscriber.

Relative to the problem of T. E. Redman, Groveport, Ohio, as to the method used to take care of expansion in metal-lined cornice gutters, wish to say there are definite methods used for that purpose, especially where copper is the metal used.

At "A" I have a rough sketch of metal lines for such a gutter. Along the outer edge as at C a drip strip is nailed on, turning out ½″ or so and down whatever is required to form a drip. The gutter liner folds over this as at C, but is not mashed or squeezed up close.

If the roof is a metal one, the upper edge is locked or folded and cleated as in flat lock roofing and soldered. No nails should be driven through the roof or gutters, but cleats used instead. Where shingles or other styles of roofing are used provision must be made so the roofing does not bind or nails extend through apron of gutter.

At high point of gutter expansion heads are used, indicated at A, C, B.

The head A solders at end of gutter strip as shown, while B sets back about two inches, so the metal laps as shown so the heads are about ¾″ apart.

The top edges of heads are turned out about ¾″ and a cap strip as indicated at C put on in such a manner that the metal can vary ¾″ in length without binding.

In figure "A" the cap strip indicated by dotted lines is clinched over drip strip as at C at bottom, the top having a gore piece soldered over cap strip at top, but not onto apron of gutter.

A water spreader should be soldered onto cap strip to keep water from running down it and over edge of gutter.

If this method is followed out carefully it will handle the problem of expansion and contraction and seam troubles caused by it very nicely.

Any other subscribers who have ideas of their own along this line will please us greatly by submitting these ideas for publication.

Peoria, Illinois, Sheet Metal Trade Making Great Strides in Vocational Training School

Peoria Sheet Metal Contractors' Association Instrumental in Getting Courses Into High School

INCREASED interest for the next school year in the sheet metal trade course at Manual Training High School is anticipated by the Peoria Sheet Metal Contractors' Association.

The association was instrumental in having the course installed two years ago, in September, 1925. The course has received the approval of the state department of education and has had the constant support of the contractors.

Any boy who is in high school or who has finished the eighth grade may enroll in this two-year trade course. It may be taken without other subjects or may be combined with other high school work so as to earn the regular high school diploma.

Students Working

"The course presents an opportunity to a boy to go through high school and at the same time gain the elements of one of our most promising mechanical trades," Harry Becker of the Contractors' Associaiton said. "All of the boys who were members of the two sheet metal classes during the last year are spending the summer working for Peoria sheet metal contractors.

"Not many years ago we thought of sheet metal work as including roof work and the shop work dealing with tinware, buckets and tubs. In more recent years the public has realized that sheet metal connected with furnace work has also become an important part of the trade.

"However, the public has not yet become aware of the tremendous new demands of modern industry that are being made on what used to be called the tinner's trade. Almost every form of factory production and all our building operations are demanding their share of the sheet metal workers' services.

Help Build Autos

"The automobile industry has created a demand for thousands of sheet metal workers. All the fenders, hood covers and most of the bodies of automobiles are of sheet metal. The modern repair garage is not complete without its special equipment for straightening dents and soldering. In fact, body work on automobiles has gone so far that there are special repair concerns which do nothing but this work. They employ expert sheet metal workers in large numbers.

"The modern factory is constantly calling for new machine covers, safety guards, conveyors, dust collectors and exhaust systems. This work cannot be produced in quantity, but must be made as needed to fit the particular machine or other use. In addition to good mechanical ability, the trade requires that the workman be intelligent and able to design the part for the particular purpose.

"The building trades have always counted heavily on the sheet metal worker for help. Hardly a building of any size is erected today without there being some sheet metal work. Roofs, flashings, gutters and drain spouts all have their place. Outside work of this type is almost a trade in itself.

Demand Growing

"With our modern method of placing business buildings close together without intervening space, the demand has come for ventilators, forced draft equipment and piping that is made and installed by the sheet metal worker. Laundries, cleaning establishments and all other plants producing dust or fumes are required by law to call on the sheet metal worker for aid in ventilating equipment and piping to carry away the objectionable material.

"In our newer business buildings we find another use for the sheet metal worker. The doors and casings, base boards and windows and their casings may be all of sheet metal. It may look like wood, but rap on it and it will prove to be sheet metal.

Good Workmen Scarce

"With all of these increased uses for sheet metal, it is not surprising that good tradesmen in this work are scarce. The demand has increased so fast that there are not enough first-class workers to go around.

"A few years ago the man who could make the standard seams and run on solder was considered a 'tinner.' Now, however, he must be able to design and lay out a new job as well as make the joints to be considered a good workman.

"This increase in the types of work demanded of the sheet metal trade, coupled with a shortage of men in the trade who can do the layout or design work, has created a demand in Peoria for systematic trade training in sheet metal work."

The American Welding Society Will Hold Its Fall Meeting in Detroit, September 19 to 23

Headquarters of the American Welding Society have issued a tentative program of the 1927 fall meeting of the society. The meeting is to be held in the Book Cadillac Hotel, Detroit, Michigan, September 19 to 23. A fine program has been arranged treating many phases of welding. Arrangements have also been made for the entertainment of the ladies, who are cordially invited to attend.

Buying a Roof Like Buying Insurance Policy — Business Proposition

Upkeep a Grim Taskmaster—Possible Damage to Building's Contents Must Be Considered

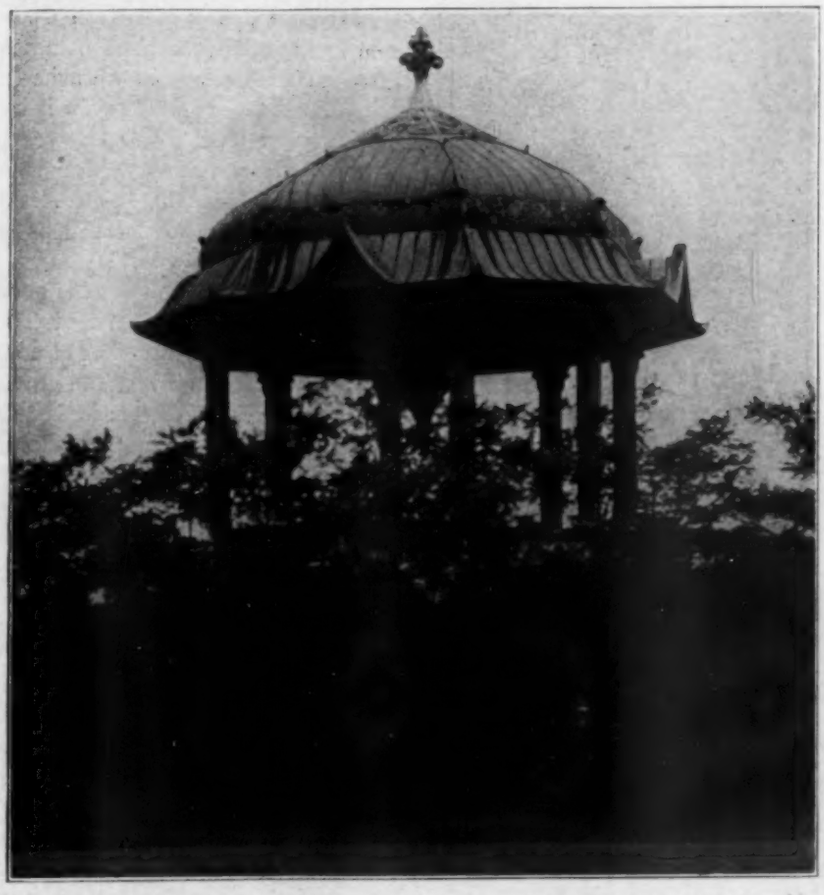
By John F. Gowen, Architectural Engineer, Copper & Brass Research Association

THE roof is a very important part of a building. Foundations, walls, windows, heating plant, etc., each plays its part in a structure (and a very real one it is) but the roof requires great care in design and construction and, certainly, most constant care after the building is in use.

For the roof protects the interior. It must be laid tight and kept tight. Decorations and fixtures are expensive. They must be protected from damage by the elements.

The many roofing materials now on the market can be divided loosely into two classes—those which are durable but comparatively expensive, and those which are cheap but short-lived.

In the first group are the tiles, the slates, the non-ferrous metals and other mineral roofings. These do not show appreciable deterioration after years, even centuries, of exposure. In the second group are the various shingles or small-piece roofings and others, mostly of organic base. Perhaps twenty years might be demonstrated for the best of them under the best conditions.



Pagoda Covered with Sheet Copper and Located in Garfield Park on the West Side of Chicago. The Roof Has Taken on a Green Color Which Makes It Stand Out in Beautiful Relief

Even more important than the roofing material is the flashing material. It is not particularly difficult to make the plane surfaces of a roof tight against the ravages of time and storm. Slate and copper nails will last for generations. So will sheet copper, or lead, or tile. Nor is it difficult to make the flashings tight—for a while. The trouble comes when the flashings begin to give out. Usually the first evidence of this is the appearance of water on the walls or ceilings.

As soon as a building has been finished and is in use, the governing body sets itself to the task of discharging the indebtedness incurred in the building. This is no light burden and it is made much heavier if, a few years after completion, the repair bill begins to mount. It is, perhaps, natural and proper to save where possible on the original cost, but any Building Committee that cheapens the roof, with certain knowledge or even reasonable expectation that it means constant and ever increasing repairs, is false to the trust placed in it. Upkeep is a grim taskmaster.

Moreover, it is easier to include a durable roof covering in the original design and raise the extra money needed to pay for it when there is interest in and enthusiasm for the new project, than it is to find funds for incessant repairs, and, sooner or later, a replacement.

Let us consider as a practical problem the roof of a church costing $100,000. At present prices for building the area covered by this church would be about 5,700 square feet, and the roof area, allowing for steep slopes, dormers, etc., is easily 8,000 square feet, or 80 squares (a square being 100 square feet).

The labor on all types of roofing in these days of high wages is fairly close. The differential between durable and non-durable roofings

is, therefore, mostly one of material, about $20 per square. So the extra cost of a durable roof covering for our church is $1,600.

If we assume that the non-durable roof costs $25 per square, or $2,000, 2% of the total cost of the structure, and depreciation is taken at 5%, then the reserve to be set up yearly for the roof alone is $100. This represents 6% of $1,667, and indicates that we can well afford to spend $1,600 for a durable roof which will carry no depreciation or replacement charges.

So much for the roof coverings. How about the flashings and gutters and leaders? The sheet metal work on our church will cost between $500 and $1,000, or even more, for non-lasting materials. Seven hundred dollars is a conservative figure. For durable metals let us assume an increase of $250, which is high. This represents an addition of ¼ of 1% to the original $100,000. The interest charge is $15 per annum, a negligible increase in carrying charges.

The total extra cost for a roof with a minimum depreciation rate and the assurance of generations of repair-free service is $1,850. Now, as accountants will point out, in twenty years $1,850, at annual compound interest at 5%, will amount to $4,908. But no cheap roofing will last for twenty years without repairs and none but durable flashings will last more than five years. every buyer of a roof, and when the roofer sees the word tin indelibly written on a specification sheet he should get a tremendous pairing becomes a fixed item of the annual budget. Because of high labor cost, the expense of scaffolding, etc., and the necessity of removing and replacing roofing in order to renew flashings, it will cost at least $900 for new flashings. To do this three times in twenty years will take $2,700. If the usual method of yearly patching is adopted, this allows $180 per year, a very low figure, for roof repairs.

Assuming that our $1,850 saving is placed at 5% and that we renew the flashings every five years, how much money will be left at the end of twenty years for our new roof, no repairs being made to the roof itself in this time?

$1,850 at 5% for 5 years amounts to	$2,361
Less cost of new flashings..	900
	$1,461
$1,461 at 5% for 5 years amounts to	$1,865
Less cost of new flashings..	900
	$ 965
$965 at 5% for 5 years amounts to	$1,230

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Blotter Used by Jack Stowell

Less cost of new flashings..	900
	$ 330
$330 at 5% for 5 years amounts to	$ 421

Twenty years have elapsed, the flashings have been renewed three times and the church has $421 with which to buy an entirely new roof. And a new roof and flashings cannot be purchased for $3,100, what they originally cost. Scaffolding, tearing off the old roof, replacing rotted wood sheathing, etc., will run the cost to, conservatively, $4,000.

Of course, if, in addition to the above sum, $100 is put aside yearly for twenty years at 5% as a depreciation reserve, there will be available $3,306, which will go a long way toward replacing the roof.

However, in making estimates of this kind we must face facts. After spending $100,000 for a church very few congregations are going to have $1,850 to put in the bank for twenty years; and assuming they do set up the proper depreciation reserve of $100 per year the flashing replacements would leave only $606 for the new roof.

Moreover, no roof covering possesses "one horse chaise" qualities. Any roof not covered with material of unquestioned durability will begin to make trouble in a few years. Long before twenty years have elapsed—in half that time—leaks will have spoiled the decorations or ruined the organ.

The point is obvious. It is good business to buy a durable roof. The money wasting potentialities of non-durable roofings are real and grave, and any owner so cursed will quickly find a cheap roof as hideous and unbearable a burden as Sinbad's old man of the sea.

Does It Have Anything to Do to Prevent the Spread of Fire?

A chimney is the method by which draft is generated in fireplaces, furnaces or boilers, and if a roof is removed from the top of the burning exterior of a building, would it not act as a chimney?

Elsewhere in this issue is printed sections taken from the building laws of this city dated 1907, concerning roofs. Just read them over and you will find the same thought running through these laws; that they were made to prevent the spread of fire from one building to others.

Did you ever see a fireman or insurance inspector put his head above the roof line? The roof is the most important part of the building, when you consider the part it plays, if it is metal, in preventing the spread of fire.

Think of Your Market as One Customer, Counsels Walter Chrysler

American People Are So Progressive They Move Swiftly and Demand Service

THERE are three prime requisites to the successful manufacture and merchandising of a commodity, according to Walter P. Chrysler of the Chrysler Corporation. These are: 1. Excellence in the product. 2. A high order of integrity in the manufacture of that product. 3. Public faith in the personal responsibility of the manufacturer.

This applies as much to warm air furnaces and their installation, and to sheet metal products as it does to automobiles or any other products; therefore, what Mr. Chrysler has to say on the subject can be read with profit by everyone in the sheet metal and warm air heating business.

"A new sense of responsibility has come over the manufacturer. This new sense of responsibility is healthy and sound. It keeps the member keyed up to a high pitch of endeavor. He must deliver. He must dig and delve to find better processes and b e t t e r products. There is no such thing as divorcing himself from his public. If he swells with his own importance and gets out of touch with people his punishment is swift and sure. The very publicity which helped make him may break him if he lags or falters in fulfilling the expectations which it creates.

"The spotlight focuses attention, but it also reveals blemishes. But if the manufacturer keeps his balance and sense of proportion, if he treats as a trust the confidence which the public reposes in him, the new business man has it in his power to conquer new worlds of industrial accomplishment.

"It is a good thing for those of us who are dependent upon the satisfaction of thousands of customers to think of them sometimes as just one customer. If we will picture to ourselves one ordinary man or woman and his or her thoughts about us as vital to our continued business well-being, the seriousness of satisfying the consumer will strike home. There is really no exaggeration in visualizing a business as one man or woman. *That is what determines the fate of the business in due time—not, strictly speaking, the satisfaction of one person, but the satisfaction of individual units.*

"It is amazing, for instance, the damage just one deficient motor car can do to the company which manufactures it. (The same is true of sheet metal or warm air furnaces.) *The voice of the complainant is not heard all over the land, but it is heard all over his home community.*

"That is one of the hazards of building business so big that it loses faith with the ultimate consumer. That is one reason why most people have a friendlier feeling for a business which is headed by a real, living human entity. They may never meet him or even see him, but they know he is there and they also know well the kind of a man and the sort of a manufacturer he is.

"No business can generate any more character or humanity than the head of it and his executives pass on to their co-workers and thence to the public; and the people realize that fact.

"We must ever realize that the American people are so progressive —they move so swiftly—they demand so much more in service today than they did yesterday—that the manufacturer who was on the crest of the wave a year ago, unless he keeps pace with the procession of progress, may become old-fashioned in twelve months' time.

"If there is anything in his mental make-up which pulls back against this progressive tendency and resists it, his business will pay the penalty. If he does not anticipate the needs and requirements of his market actually to the extent of creating some of those needs, he is losing even though he seems to be registering a gain. We have created by the very spirit of the age in which we live an insatiable appetite for better and better service, and if we do not satisfy that appetite we automatically lag behind.

"There is such a thing as a manufacturer thinking too much about manufacturing and not enough about human beings and their needs and preferences. A manufacturer should be able to turn in his own tracks if occasion demands—he should not be afraid to negative today what he approved a year ago. He must be free to act, unhampered by past practice. He must be able to give the final word, unembarrassed by dictation.

"He is at his best when he surrounds himself with quick minds in whose conclusions he has implicit confidence—minds which will check or challenge or corroborate his own —but beyond this communion with expert minds he should be as free as the air as long as he demonstrates a mastery of his job.

"There should be frequent occasions in his busy life on which he thinks only of people, dismissing from his mind for the moment all the thousand and one details of manufacture and concentrating exclusively on a study of his own kind —their vanities and their virtues, their habits and above all their rights.

"Just about the time that a corporation thinks it has establishd the course of the industry in which it operates for the ensuing year or ten years, the public which it serves is likely to step in and upset the whole program. People have an annoying way of refusing to stay "put"—of breaking away from the classifica-

tions assigned to them by science and statistics. The manufacturer will carefully label and ticket them as preferring a certain type of product, or a certain price, or a certain kind of service, and just when he has them all located something more progressive appears upon the horizon and his calculations are completely upset.

"Of course, no business should attempt to accommodate itself to every whim of public opinion, but when public opinion begins to register itself in waves it is something with which to be reckoned. When all is said and done, the manufacturer is the servant of the public. Sounds trite, I know, but it is still literally true.

"A business which keeps itself close to its clientele, fired with the everlasting vision of building better and better, unhampered in its direction and humanized with a complete and sympathetic understanding of its public, is bound to grow just as surely as sparks fly upward.

"The big company, just like the small one, is paying careful attention to the individual buyer. He must be satisfied. It has been learned that it is good business to satisfy him completely."

Dreis & Krump Manufacturing Co., Chicago, Announces New Steel Bending Brake

The Dreis & Krump Mfg. Co., Chicago, manufacturers of Chicago steel bending brakes, announces the addition to its line of a series of all-steel forming presses of the single housing type. These have been designed to replace heavy and cumbersome machinery in the production of light work and are recommended for their convenience of operation and low cost.

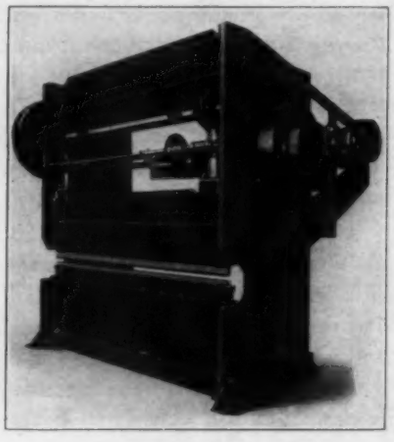
While designed on the same general principles as other machines of this type, the company has gone to unusual limits in the manufacture and refinement of its presses to make them without a superior in their particular field. The presses are rigidly constructed, with housings, ram and bed of steel plate, which is insurance against breakage.

Gears are also made of steel, the eccentric strap, knuckle bearings and gibs for slides are semi-steel castings. Eccentrics are forged steel, keyed to a high carbon shaft. Connecting screws are of carbon steel forgings.

These presses, the company states, require no foundation or pit. They set level on the floor, and are shipped set up in one piece. All bearings are of ample size, accurately fitted and grooved for piling.

The flywheel has clutch attached and runs on Timken roller bearings. The outboard flywheel shaft bearing is Timken self-aligning.

The clutch is of the multiple disc type, having asbestos friction blocks



The New Press

and is engaged by a foot treadle, adjustable to any point the full length of the machine, which also operates a friction brake simultaneously, stopping the ram instantly at any position desired when the treadle is released.

Sight force feed oilers provide automatic lubrication to eccentrics, bearings and slides. Adjustment of the ram is obtainable by an independent motor controlled by a reversing switch, both of which are standard equipment. All machines are arranged for direct motor to flywheel drive, Allis-Chalmers Texrope type.

A new circular just issued by the company gives complete sizes and specifications, including illustrations of the machines and dies. A copy of this circular, No. 28 PR, will be sent on request.

Swartwout Rotary Ventilator

From William A. Tipton, 4948 Easton Avenue, St. Louis, Missouri.

Please advise who manufactures the Swartwout rotary ventilator.

Ans.—Swartwout Company, 18511 Euclid Avenue, Cleveland, Ohio.

Furnace Covering Called "Furnace Overcoat"

From Auburn Furnace Company, West Seventh Street, Auburn, Indiana.

Kindly advise us who makes the furnace covering called the "Furnace Overcoat."

Ans.—Minwool Insulating Company, Kalamazoo, Michigan.

Samson Hand Punch

From Auburn Furnace Company, West Seventh Street, Auburn, Indiana.

Kindly advise us who makes the Samson hand punch.

Ans.—Bates Manufacturing Company, Orange, New Jersey.

Knox Everlasting Smoke Pipe

From Crane Lumber Company, 20 West Central Street, Chippewa Falls, Wisconsin.

Please advise us where we can get quotations on Knox Everlasting smoke pipe.

Ans.—Waterloo Register Company, Waterloo, Iowa.

Ambler Asbestos Shingles

From K. Hirsch and Son, 1619 North Claremont, Chicago, Illinois.

Who makes Ambler asbestos shingles?

Ans.—Asbestos Shingle, Slate and Sheathing Company, Ambler, Pennsylvania, and 319 North Wells Street, Chicago, Illinois.

Retail Hardware Doings

Iowa

David O. Reid has assumed the responsibility of operating the Reid Hardware Company, Davenport, Iowa, upon the sudden death of his father, W. M. Reid.

Illinois

Walter A. Robinson and Charles C. Miller have opened a new hardware store at 1706 Third Avenue, Rock Island.

Minnesota

M. E. Johnson, Pine City, has purchased the Larson Hardware store.

Oklahoma

J. W. White of the White Hardware Company, Centralia, has purchased the stock of the Odell Hardware Company and will combine the two stocks.

The fire* that burns unseen in thousands of homes

INGOT-IRON SHOP — Quality Metal with Quality Iron

THE only difference between rusting and burning is time. You can feel and see the fire produced by rapid burning. When metal rusts, the process is too slow to see. You have no warning before the damage is done.

The way to fight rust-fire in your home is to make sure that you use a rust-resisting metal.

Look for the sheet metal shop in your neighborhood that displays the "Armco" Ingot Iron Shop sign! This sign is your guarantee of a long-time job on gutters, downspouts, roofing, flashing and all other weather-exposed metal parts about a house.

For the Armco Shop man will use rust-resisting "Armco" Ingot Iron. No other low-cost metal can equal it in fighting rust. "Armco" Ingot Iron is the purest iron made. It is almost entirely free from the impurities that hasten rust in steel and other irons. And because "Armco" Ingot Iron takes and holds a coat of zinc much purer than the galvanizing on steel, it offers a *double* protection against rust.

The sheet metal man will tell you that sixty cents of every dollar you spend for sheet metal work goes for labor. Protect this investment by insisting upon enduring "Armco" Ingot Iron.

And in INDUSTRY... More and more, executives are making it a policy to insist on the use of "Armco" Ingot Iron for tanks, stacks, breechings, and all sheet metal work. In every industry, this rust-resisting iron is saving thousands of dollars on repair jobs by putting them off for years. The Armco Triangle stamped on every sheet identifies the purest, most enduring iron made.

ARMCO INGOT IRON RESISTS RUST

AMERICAN ROLLING MILL COMPANY
MIDDLETOWN, OHIO

* *RUST-FIRE! The only difference between rusting and burning is time—both are oxidation. You can feel and see the fire produced by rapid burning. But when metal rusts, the process is too slow to see. Rust is the "ash" of this fire.*

A dramatic story—RUST-FIRE! And one that is persuading buyers of sheet metal work that to pay a little more for "the iron that's made to last" is a wise investment. Collier's, Saturday Evening Post, Nation's Business, and other magazines are bringing these convincing messages to your customers, whether they be homeowners or industrialists. So, if you use ARMCO Ingot Iron, extra profits are coming your way. If you have an Ingot Iron Shop, better still—bigger profits. If you have neither advantage, opportunity is knocking at your door, and it's time to ask The Secretary of Ingot Iron Shops, Middletown, Ohio, how you may enjoy these benefits. Write him today, His counsel places you under no obligation.

Iron and Steel Industry Is Steadily Moving Upward—Customary Fall Stride Expected by Latter Part of August

Pig Iron Market Is Quite Steady—Nonferrous Metal Prices Are Higher

DEMAND for iron and steel in the aggregate is broadening slowly despite the heavy handicap of midsummer inertia. Improvement is spotted both as to products and districts, but on the whole the rising tendency manifest since the low point early in July continues.

There is a tendency to look to the last half of August for the development of the customary fall pick-up in iron and steel demand. Meanwhile, mill operations are paralleling bookings in their moderate recovery from the recent midsummer low point.

Steelmaking for the industry as a whole is averaging 75 per cent, with Steel Corporation subsidiaries in a more comfortable position than independents. Quotations on steel, especially sheets, have resisted pressure and seem firmer.

Pig Iron

Pig iron inquiries at Pittsburgh are scarce. Producers claim to be shipping all they make and one has been shipping more than it has produced in the past several weeks.

Consumers apparently are taking out everything due them on contracts, but are not issuing new inquiries. Several transactions are noted involving around 1,000 tons of foundry iron at a time, these being noncompetitive contracts placed quietly with regular sources of supply.

Several small sales of No. 2 plain are noted at $18, valley. One or two orders involving 1,000 tons of gray forge iron have been booked at $17.50, valley. Such consumers apparently want iron of a certain specified make, since at least two producers are quoting 50 cents less, or $17.50, base.

One sale of malleable was noted in the past week, involving 200 tons at $17.50, valley. Bessemer iron is sold in carloads or 100 ton lots at $18.50. Basic iron is nominal at $17.50.

Summer dullness, characterized as the worst in years, has descended upon the Chicago pig iron trade.

The market is drifting along with consumers indicating future purchases of anywhere from a carload to 1,000 tons. No large sales or inquiries were noted during the past week. No. 2 foundry and malleable continue firm at $20, Chicago furnace. Some southern iron is being sold in territory adjacent to Chicago at the equivalent of $17, Alabama, base, making the delivered, Chicago, river-rail price $21.43.

Malleable sales in small lots totaling 600 tons are reported by one seller. A Kalamazoo buyer has offered $18.50, Chicago, on 3,000 tons of foundry iron.

At Birmingham an occasional order is placed for several thousand tons of pig iron, while demand for small lots is steady.

The new price, $17.25, base, Birmingham, has been the incentive for a little buying.

Copper

Copper sold at 12.62½ cents, Connecticut, July 16, and then went up by steps of ⅛ cent to 13 cents Thursday afternoon. Sales at the higher levels were not as large as at the lower.

The Copper Exporters, Inc., were conservative in raising their price, but finally went to 13.25 cents c.i.f. Good domestic and export business continues.

Tin

Buying of tin was active at times, but not nearly so large as in the previous week. This was a natural development, and prices backed and filled without much net change. Buying was largely by dealers and it was difficult to tell to what extent it was short covering and what might have been against an expected rise.

The metal is in good supply, and while sales were of all positions, interest is mostly ahead. August is nearly level with spot and July prices, and the whole spread is unusually narrow.

Lead

The rise of lead in London was a big factor. The market here had good business previously and needed only this signal to go up 30 points. The rise here stimulated additional business.

Zinc

Prime western zinc was moderately active the past week at gradually rising prices. Business was mostly for early shipment and it is believed much buying remains to be done for August.

Only a little metal has been sold for September. Strong ore prices continue to be a factor in the situation.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, $39.50; commercial 45-55, $36.50; plumbers', $33.50, all per 100 pounds.

Old Metals

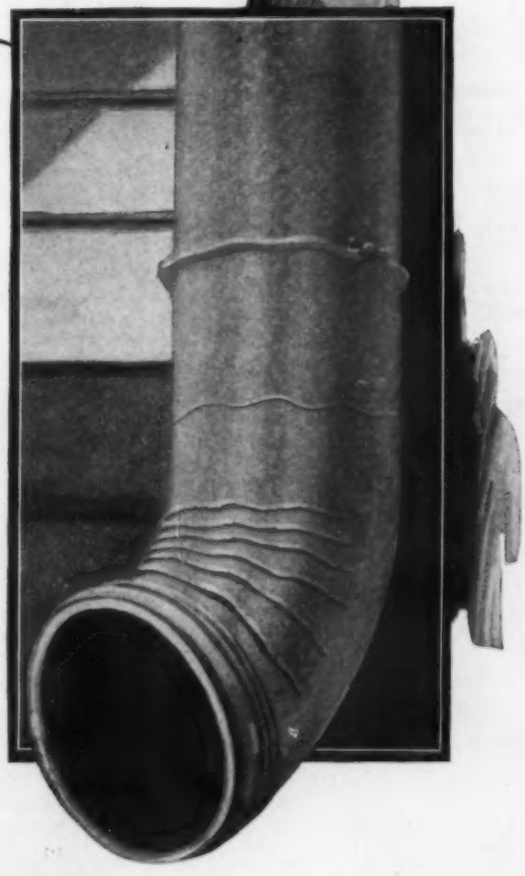
Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, $17.00 to $17.50; old iron axles, $20.00 to $20.50; steel springs, $14.75 to $15.25; No. 1 wrought iron, $11.50 to $12.00; No. 1 cast, $12.75 to $13.25, all per net tons. Prices for non-ferrous metals are quoted as follows, per pound: Light copper, 9 cents; zinc, 3½ cents; cast aluminum, 13¾ cents.

Wheeling
CORRUGATING COMPANY

Doubly Durable Because Doubly Protected

1 The base metal is the highly rust-resistant Copper Alloy, known everywhere as Ohio Metal.

2 The conductor is completely formed and finally *hand-dipped in pure molten zinc.*



A SAMPLE of Wheeling Hand-Dipped Conductor will enable you to judge why the trade, generally, accepts it as the most satisfactory and the most economical conductor made.

Note that the metal base is completely imbedded in a thick, impenetrable protective coating of pure zinc. Note also that the seams, edges and surfaces are thoroughly and uniformly covered—the result of *hand-dipping after forming.*

Exposed to the air, the zinc first protects itself by a natural surface oxidization. This ceases abruptly after closing the pores of the zinc and a lasting barrier to the elements is the result.

Made of Ohio Metal, hand-dipped in pure molten zinc, this conductor is stronger, more rigid and doubly durable. Let us send you a sample for close-up inspection.

Wheeling

HAND DIPPED CONDUCTOR

Wheeling Corrugating Company, Wheeling, W. Va.

NEW YORK PHILADELPHIA CHICAGO KANSAS CITY
ST. LOUIS RICHMOND CHATTANOOGA MINNEAPOLIS

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

METALS

PIG IRON

Chicago Fdy., No. 2	$20 00
Southern Fdy. No. 2	23 26
Lake Superior Charcoal	27 04
Malleable	20 00

FIRST QUALITY BRIGHT TIN PLATES

IC	20x28 112 sheets	$25 10
IX	20x28	29 60
IXX	20x28 56 sheets	16 20
IXXX	20x28	17 55
IXXXX	20x28	18 95

TERNE PLATES

		Per Box
IC	20x28, 40-lb. 112 sheets	$26 00
IX	20x28, 40-lb. 112 sheets	28 50
IC	20x28, 25-lb. 112 sheets	21 75
IX	20x28, 25-lb. 112 sheets	24 25
IC	20x28, 20-lb. 112 sheets	20 00
IV	20x28, 20-lb. 112 sheets	22 50
IC	20x28, 15-lb. 112 sheets	18 50

"ARMCO" INGOT IRON PLATES

No. 8 ga. up to and including ¼ in.—100 lbs. $4 55

COKE PLATES

Cokes, 80 lbs., base, 20x28	$13 60
Cokes, 90 lbs., base, 20x28	13 80
Cokes, 100 lbs., base, 20x28	14 00
Cokes, 107 lbs., base, IC 20x28	14 30
Cokes, 135 lbs., base IX 20x28	16 40
Cokes, 155 lbs., base, 56 sheets	9 20
Cokes 175 lbs., base, 56 sheets	10 05
Cokes, 195 lbs., base, 56 sheets	10 90

BLUE ANNEALED SHEETS

Base 10 ga. per 100 lbs.	$3 50
"Armco" 10 ga. per 100 lbs.	4 00

ONE PASS COLD ROLLED BLACK

No. 18-20 per 100 lbs.	$3 75
No. 22 per 100 lbs.	3 90
No. 24 per 100 lbs.	3 95
No. 26 per 100 lbs.	4 05
No. 27 per 100 lbs.	4 10
No. 28 per 100 lbs.	4 20
No. 29 per 100 lbs.	4 35
No. 30 per 100 lbs.	4 45

"ARMCO" GALVANIZED

"Armco" 24 per 100 lbs.	$6 15

GALVANIZED

No. 16 per 100 lbs.	$4 30
No. 18 per 100 lbs.	4 45
No. 20 per 100 lbs.	4 60
No. 22 per 100 lbs.	4 65
No. 24 per 100 lbs.	4 80
No. 26 per 100 lbs.	5 05
No. 27 per 100 lbs.	5 15
No. 28 per 100 lbs.	5 30
No. 30 per 100 lbs.	5 70

BAR SOLDER

Warranted

50-50 per 100 lbs.	$29 50

Commercial

45-55 per 100 lbs.	26 50
Plumbers per 100 lbs.	23 50

ZINC

In Slabs $8 50

SHEET ZINC

Cash Lots (600 lbs.)	$11 75
Sheet Lots	12 75

BRASS

Sheets, Chicago base	17½c
Mill Base	17¾c
Tubing, brazed base	26½c
Wire, base	18c
Rods, base	15¼c

COPPER

Sheets, Chicago base	21¾c
Mill Base	20¾c
Tubing, seamless base	24¾c
Wire, No. 9, B & S Ga.	17¾c
Wire, No. 10, B & S Ga.	18c
Wire, No. 11, B & S Ga.	18¼c
Wire, No. 8, B & S Ga. and heavier	17½c

LEAD

American Pig	$7 50
Bar	8 50

TIN

Big Tin per 100 lbs.	$72 00
Bar Tin per 100 lbs.	73 00

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	6¼c per lb.
Mill board 3/32 to ⅛	6c per lb.
Corrugated Paper (250 sq. ft. to roll)	$6 00 per roll

BRUSHES

Hot Air Pipe Cleaning

Bristle, with handle, each $0 85

Flue Cleaning

Steel only, each 1 25

BURRS

Copper Burrs only 40-5%

CEMENT, FURNACE

American Seal, 5-lb. cans, net	$ 40
American Seal, 10-lb. cans, net	80
American Seal, 25-lb. cans, net	2 00
Pecora per 100 lbs.	7 51

CHIMNEY TOPS

Adams' Revolving

	Wt. Doz.	Prize Doz.
4 in.	21 lbs.	$11 00
6 in.	24 lbs.	11 50
7 in.	30 lbs.	13 50
8 in.	33 lbs.	15 00
9 in.	51 lbs.	16 50
10 in.	56 lbs.	18 00
12 in.	66 lbs.	22 00
14 in.	110 lbs.	36 00

CLINKER TONGS

Front Rank, each	$0 75
Per doz.	8 40

CLIPS

Damper

Acme, with all tail pieces, per doz.	$1 25
Non Rivet tail pieces, per doz.	25

COPPERS—Soldering

Pointed Roofing

3 lb. and heavier	per lb. 40c
2½ lb.	per lb. 45c
2 lb.	per lb. 45c
1½ lb.	per lb. 55c
1 lb.	per lb. 60c

CORNICE BRAKES

Chicago Steel Bending

Nos. 1 to 6B Net

CUT-OFFS

Gal., plain, round or cor. rd.

26 gauge	30%
28 gauge	35%

DAMPERS

"Yankee" Hot Air

7 inch, each 20c, doz.	$1 75
8 inch, each 25c, doz.	2 40
9 inch, each, 30c, doz.	2 75
10 inch, each 32c, doz.	3 00

Smoke Pipe

7 inch, each	$0 25
8 inch, each	40
9 inch, each	50
10 inch, each	60
12 inch, each	90

Reversible Check

8 inch, each	$ 56
9 inch, each	70

Diamond Smoke Pipe

7 inch, doz.	$ 5 00
8 inch, doz.	8 00
9 inch, doz.	12 00
10 inch, doz.	15 00

Adams' Sheet Metal

7 inch, doz.	$ 1 60
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	2 80

DIGGERS

Post Hole

Iwan's Split Handle (Eureka)

4-ft. Handle...per doz.	$14 00
7-ft. Handle...per doz.	36 00

Iwan's Hercules pattern, per doz. 14 90

EAVES TROUGH

Galv. Crimpedge, crated 75 & 5%	
Zinc, "Barnes"	60%

ELBOWS

Conductor Pipe

Galv., plain or corrugated, round flat Crimp.

28 Gauge	60%
26 Gauge	45%
24 Gauge	

Galv. & Terne Steel

Plain Rd. and Rd. Corr.:

28 Ga.	60%
26 Ga.	45%
24 Ga.	15%

Square Corrugated

No. 28 Gauge	50%
26 Gauge	35%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.

Not nested	70 & 5%
Nested solid	70 & 5%

Sq. Corr., A. & B. & Octagon:

28 Ga.	50%
26 Ga.	35%

Portico

1", 1¼", 1½" 45%

Copper

16 oz., all designs 45%

Zinc—

All styles 60%

ELBOWS—Stove Pipe

1-piece Corrugated. Uniform Blue "Milcor" No. 28 Gauge.	Doz.
5-inch	$1 25
6-inch	1 35
7-inch	1 75

Special Corrugated

6-inch	$1 00
7-inch	1 60

Adjustable—Uniform Blue

"Milcor" No. 28 Gauge. Uniform Blue.	
5-inch	$1 75
6-inch	1 85
7-inch	2 15

WOOD FACES—50% off list.

FENCE

726-6-12½% (100 rods)	$28 68
1948-6-14½% (100 rods)	43 42

FILES AND RASPS

Heller's (American)	50-10%
American	60-10%
Arcade	50%
Black Diamond	50%
Eagle	50%
Great Western	50%
Kearney & Foot	50%
McClellan	50%
Nicholson	50%
Simonds	60%

FIRE POTS

Clayton & Lambert's

East of west boundary line of Province of Manitoba, Canada, No. Dakota, So. Dakota, Nebraska, Kansas, Oklahoma, Amarillo, San Angelo and Laredo, Texas 52%

West of above boundary 48%

Geo. W. Diener Mfg. Co. Ea.

No. 02 Gasolene Torch, 1 qt.	$ 5 55
No. 0250, Kerosene, or Gasolene Torch, 1 qt.	7 50
No. 10 Tinner's Furn. Square tank, 1 gal.	12 60
No. 15 Tinner's Furn. Round tank, 1 gal.	12 60
No. 21 Gas Soldering Furnace	3 60
No. 110 Automatic Gas Soldering Furnace	10 50

Double Blast Mfg. Co.

Gasolene, Nos. 25 and 26 60%

Quick Meal Stove Co.

Vesuvius, F. O. B. St. Louis 30%

(Extra Disct. for large quantities)

GALVANIZED WARE

Pails (Galv. after made), 10-qt.	$2 12
Tubs (Galv. after made).	
No. 1	6 00
No. 2	6 85

GLASS

Single Strength, A, 25-in. brackets	87%
Single Strength, A, 24 to 40-in. bracket	86%
Single Strength, A, all other brackets	86%
Double Strength, A, all sizes	86%

HANGERS

Conductor Pipe

Milcor Perfection Wire 25%

Eaves Trough

Milcor Eclipse Wire	15%
Milcor Triplex Wire	10%
Milcor Milwaukee Extension	10%
Milcor Steel (galv. after forming) List plus	12½%
Milcor Selflock E. T. Wire, List plus	50%

HOOKS

Box

V. & B. No. 1, each $0 26

Conductor

"Direct Drive" Wrought Iron for wood or brick 15%

Hay

V. & B. No. 1, each $0 26

HUMIDIFIERS

"Front-Rank," Automatic

In single lots	50%
In lots of 10 or more	50-5%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

LIFTERS

Stove Cover

Coppered per gro.	$6 00
Alaska per gro.	4 75

MALLETS

Tinners

Hickory per doz. $2 25

MITRES

Galvanized steel mitres.

28 Ga.	70
26 Ga.	60-20

NAILS

Cut Steel	$4 25
Cut Iron	4 35

Wire

Common	2 95
Cement Coated	2 95

(Continued on Page 212)

Made in nine sizes

FAMOUS SINCE 1819—

Over one hundred years of tool making experience is built into each and every PEXTO Snip. The line is very complete and consists of every practical style and size. Material is the best, the finish is durable and they are fully guaranteed.

Write for catalogue No. 25A showing complete line of Sheet Metal Working Machines and Tools.

THE PECK, STOW & WILCOX CO.

SOUTHINGTON, CONN., U. S. A.

THE

J. M. & L. A. OSBORN COMPANY

1541-51 East 38th Street

CLEVELAND, OHIO

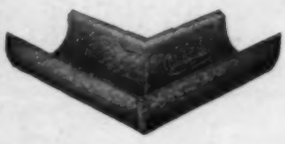
Buffalo Warehouse . . . . . 64-68 Rapin Street

"Everything Used in Sheet Metal Work"

Eaves Trough Miters

Champion Two-Piece

These miters are made in two pieces, are formed to exact size and double seamed together on special machines, are perfectly square and level. Cannot be broken or pulled apart. Ready for use, for inside and outside bead slip or lap joint.



Inside Corner

Outside Corner

When ordering miters always indicate whether for "inside" or "outside" corners and if Slip Joint Miters are ordered state whether for right or left hand.

At the Service of Steel Users

INLAND STEEL COMPANY

38 *South Dearborn Street, Chicago*

Works: Indiana Harbor, Indiana; Milwaukee, Wisconsin
Chicago Heights, Illinois

Branch Offices and Representatives

ST. PAUL • ST. LOUIS • SALT LAKE CITY • MILWAUKEE
KANSAS CITY • NEW ORLEANS • EL PASO

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NETTING, POULTRY

Galvanized before weaving 57½-5%
Galvanized after weaving.52½-5%

PASTE

Asbestos Dry Paste:

200-lb. barrel	$16 00
100-lb. barrel	8 75
35-lb. pail	3 50
10-lb. bag	1 10
5-lb. bag	60
2½-lb. cartons	35

PIPE

Conductor
Cor. Rd., Plain Rd. or Sq.

Galvanized
Crated and nested (all gauges) 75-2½%
Crated and not nested (all gauges) 70-15%

Furnace Pipe
Double Wall Pipe and Fittings 50%
Single Wall Pipe, Round Galvanized Pipe 50%
Galvanized and Tin Fittings.50%

Lead
Per 100 lbs.....$12 50

Stove Pipe
"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested	11 50
28 gauge, 6 inch U. C. nested	12 25
28 gauge, 7 inch U. C. nested	14 25
30 gauge, 5 inch U. C. nested	10 50
30 gauge, 6 inch U. C. nested	11 25
30 gauge, 7 inch U. C. nested	13 25

T-Joint Made up
6-inch, 28 ga....per doz. $ 5.00

All Zinc
No. 11, all styles.....60%

POKERS, STOVE

W'r't Steel, str't or bent, ...per doz.	$0 75
Nickel Plated, coil handles, ...per doz.	1 10

POKERS, FURNACE

Each $0 50

PULLEYS

Furnace Tackle....per doz.	$0 60
.....per gro.	6 00
Furnace Screw (enameled) .....per doz.	75

Ventilating Register

Per gross	9 00
Small, per pair	30
Large, per pair	50

PUTTY

Commercial Putty, 100-lb Kits $3 40

QUADRANTS

Malleable Iron Damper.....10%

REDUCERS—Oval Stove Pipe

	Per Doz.
7—6, 1 doz. in carton	$2.25

REGISTERS AND BORDERS—Baseboard, Floor and Wall.

Cast Iron 20%
Steel and Semi-Steel.....40%
Baseboard 40%
Wall 40%
Adjustable Ceiling Ventilators.40%

Register Faces—Cast and Steel
Japanned, Bronzed and Plated, 4x6 to 14x14.....40%
Large Register Faces—Cast, 14x14 to 38x42.....60%
Large Register Faces—Steel, 14x14 to 38x42.....65%

RIDGE ROLL

Galv., Plain Ridge Roll, h'dld 75-10-5%
Galv., Plain Ridge Roll crated 75-10%
Globe Finials for Ridge Roll 50%

ROOFING

	Per Square
Best grade, slate surf. prepared	$ 2 30
Best talc surfaced	2 65
Medium talc surfaced	2 00
Light talc surfaced	1 20
Red Rosin Sheeting, per ton	57 00

SCREWS
Sheet Metal

7, ⅛x⅛, per gross	$0 52
No. 10, ⅜x3/16, per gross.	68
No. 14, ⅜x¼, per gross	89

SHEARS, TINNERS' & MACHINISTS'

Viking $22 00

Lennox Throatless
No. 18 .....35%
Shear blades 10%
(f. o. b. Marshalltown, Iowa.)

SHIELDS, REGISTER

No. 1 "Gem" floor....$12 00 doz.
No. 2 "Gem" wall..... 6 00 doz.

SHOES

Galv. 28 Gauge, Plain or corrugated round flat crimp...60%
26 gauge round flat crimp....45%
24 gauge round flat crimp....15%

SNIPS, TINNERS'

Clover Leaf .....40 & 10%
National .....40 & 10%
Star 50%
Milcor .....Net

SQUARES

Steel and Iron.....Net
(Add for bluing, $3 per doz. net.)

Mitre .....Net

Try .....Net

Try and Bevel.....Net

Try and Mitre.....Net

Fox's .....per doz. $6 00

Winterbottom's 10%

STOPPERS, FLUE

Common .....per doz. $1 10
Gem, No. 1.....per doz. 1 10
Gem, flat, No. 3....per doz. 1 00

VENTILATORS

Standard.....30 to 40%

WIRE

Plain annealed wire, No. 8, per 100 lbs.	$3 05
Galvanized barb wire, per 100 lbs.	3 90
Wire Cloth—black painted, 12-mesh, per 100 sq. ft.	1 65
Cattle Wire—galvaniz'd catch weight spool, per 100 lbs.	3 65
Galvanized Hog Wire, 80 rod spool, per spool	3 15
Galvanized Plain Wire, No. 9, per 100 lbs.	3 40
Stove Pipe, per stone	1 10

WRINGERS

No. 790, Guarantee	each $5 10
No. 770, Bicycle	each 4 70
No. 670, Domestic	each 4 35
No. 110, Brighton	each 3 70
No. 750, Guarantee	each 5 10
No. 740, Bicycle	each 4 70
No. 22, Pioneer	each 3 40
No. 2, Superb	each 2 65

YES, you can get as good roofing tin today as you did in the old days if you demand Target-and-Arrow brand—formerly known as "Taylor's Old Style." It is the same kind of handmade tinplate we have been selling for nearly three-quarters of a century.

Today we alone employ the old-time Welsh method of hand dipping. As a consequence it costs more than other kinds—hence if your specifications allow the substitution of any other brand, you are not likely to get Target-and-Arrow.

N. & G. TAYLOR COMPANY
BROAD AND ARCH STREETS
PHILADELPHIA
H. N. TAYLOR, President

Established in the U. S. A. in 1810 by William, George and Tracy Taylor, descendants of Major John Hanbury, who introduced the art of tinning into Wales in 1720.

The NEW IMPROVED "STANDARD"
Rotable Ventilator

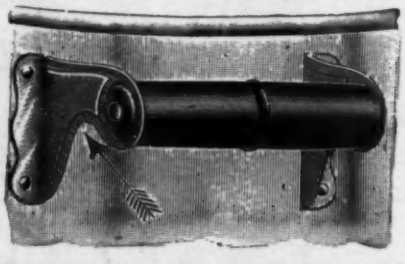
Patents pending

This favorite cone-shaped ventilator is now improved in several important points.
The weight of the ventilator body is now carried on a concave thrust bearing nested in the apex of the conical body. This bearing turns upon the pivot point of the stationary center spindle.
The bronze Guide Bushings are now made of non-corrosive bronze which minimizes friction and any tendency to screech when body is rotating.
There are other new features. Write today for new catalog and price list.

STANDARD VENTILATOR CO., LEWISBURG, PA.

RYERSON
IMMEDIATE SHIPMENT FROM STOCK
More than twenty kinds of sheets are carried in stock. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.
Write for Journal and Stock List
JOSEPH T. RYERSON & SON INC.
Chicago Detroit Milwaukee St. Louis Cincinnati Jersey City Cleveland Boston Buffalo
SHEETS

KEYSTONE BOILER HANDLES



WE make a complete line of Boiler Handles.
Also handles for Boiler Covers.
Cut shows No. 40 style.
Let us send you samples.
Complete catalog on request.

BERGER BROS. CO.
229 to 237 ARCH STREET PHILADELPHIA, PA.
Warerooms and Factory: 100 to 114 Bread Street
Manufacturers of "Quaker City" line of Miters, Ends, Caps and Outlets

PERFORATED METALS

All Sizes and Shapes of Holes
In Steel, Zinc, Brass, Copper, Tinplate, etc.
For All Screening, Ventilating and Draining
EVERYTHING IN PERFORATING METAL
THE HARRINGTON & KING PERFORATING CO
5649 FILLMORE ST.—CHICAGO, ILL., U. S. A.
NEW YORK OFFICE, 114 LIBERTY ST.

BUYERS' DIRECTORY

Acetylene (Gas) Dissolved.
Prest-O-Lite Co., Inc., New York, N. Y.

Air Filters.
Reed Air Filter Co., Louisville, Ky.

Bale Ties.
American Steel & Wire Co., Chicago, Ill.

Blowers.
Sturtevant Co., B. F., Boston, Mass.

Bolts—Stove.
The Kirk-Latty Co., Cleveland, Ohio
Lamson & Sessions Co., Cleveland, Ohio

Brakes—Bending.
Dreis & Krump Mfg. Co., Chicago, Ill.

Brakes—Cornice.
Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper.
Copper & Brass Research Association, New York
Merchant & Evans Co., Philadelphia, Pa.

Cans—Garbage.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Castings—Malleable.
Fanner Mfg. Co. Cleveland, Ohio

Ceilings—Metal.
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Milwaukee Corrugating Co., Milwaukee, Wis.
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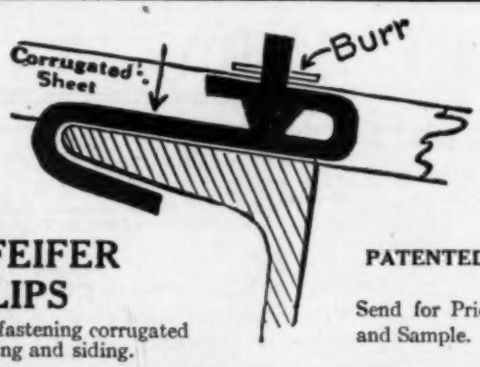

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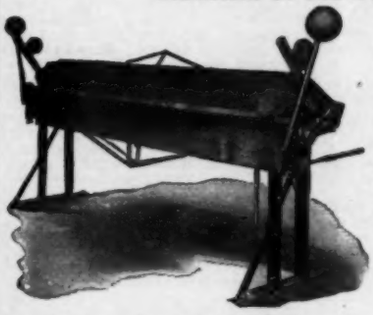

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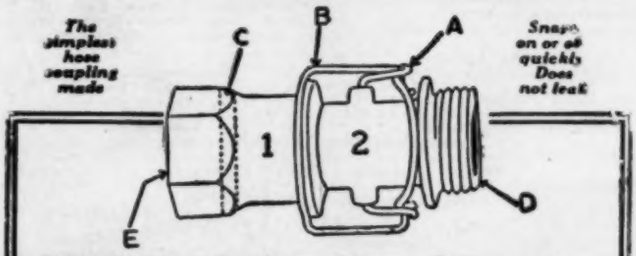

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Situation Wanted—A first class, all around mechanic, layout man and foreman desires position. Cornice, skylight, blow pipe, ventilation, roofing, heating, etc. At present foreman of large shop in Eastern Ohio. Hard worker and steady. Please state wages and hours. Address —B–76, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 3–3t

Situation Wanted—By an A1 sheet metal worker and layout man; 30 years' experience; age 46; sober; steady; married and hard worker. Prefer shop work. Experience covers every phase of sheet metal and tin work. Please state wages and hours. Address B–86, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 5–3t

Situation Wanted—Permanent position by capable sheet metal worker, pattern cutter and A1 furnace man. Eighteen years' experience; married; good habits; Missouri or states adjoining preferred. Please state full particulars and wages in first letter. Address B–81, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 4–3t

Situation Wanted — By a first-class plumber; can also do heating and tinwork; can estimate, read blue prints or run shop. Am steady and reliable and want just such a job. Illinois or Iowa preferred, but will go anywhere. State full particulars. Address B–85, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 5–3t

Situation Wanted—Heating engineer with ten years' sales experience in hardware, sheet metal products, furnaces and supplies is open for position. Prefer to sell Steel furnaces. Give full particulars in answering. Address—B–74, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 3–3t

Situation Wanted—Permanent position by capable plumber carrying Illinois and Wisconsin license. Lead and iron worker. Thoroughly reliable. Address B–68, care AMERICAN ARTISAN, 620 South Michigan Avenue. Chicago, Illinois. 2–3t

Situation Wanted—By first class sheet metal worker, warm air furnace installer. Plumbing and hot water heating. Address B–83, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 5–3t

Situation Wanted—A first class sheet metal worker and furnace man who also understands the making of electric signs. Southwestern states preferred. Address-Box 2417, Los Angeles, California. 4–3t.

SITUATION WANTED

Situation Wanted—About August 1st, sheet metal worker of wide experience will be free. First class shop man and pattern cutter. Neat and accurate mechanic and competent to act as foreman or assistant if required. Good health and habits. Address—B–73, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 3–3t

Situation Wanted—By an experienced sheet metal and furnace installer; steady employment; married; 50 years old; steady habits. If interested write Wm. R. H. Cooke, 1523 North 5th Street, West, Cedar Rapids, Iowa. 2–3t

Situation Wanted — By sheet metal worker and furnace installer. Fifteen years' experience. Address "Tinner," Room 37, Columbia Hotel, Rockford, Illinois. 2–3t

HELP WANTED

Wanted—At once. Combination plumber and tinner. A man that knows his business. Both in and outdoor work. **Must be steady.** This is a year around job for right man. No others need apply. Married man preferred. This is a small country town in Wisconsin. Address B–84, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 5–3t

Wanted — A first-class sheet metal worker; knowledge of plumbing preferred. One capable of doing anything that comes in an ordinary shop, gutter, blowpiping, roofing, etc. Must be capable of doing good work in reasonable length of time. Give references, experience and wages. Address B–82, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 4–3t

Wanted—Combination tinner and plumber with some sales ability. Must help clerk Wednesday and Saturday nights. State your price per week for a 52 week per year job. References required. Address—Wm. Wilker, Wyoming, Iowa. 3–3t

Wanted—Competent sheet metal worker to take charge of sheet metal department of a combination shop. Would lease to some ambitious mechanic who wants to make better than wages. Address Box 724, Lancaster, Calif. 4–3t

Wanted—Two sheet metal workers. Union shop. Only first class mechanics need apply. Address–Herbert Bartholomew, 307 Carroll Street, Elmira, New York. 4–3t.

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Wanted—Man who can do eaves spouting, furnace work and plumbing. Town of 2,000 in lower Michigan. Must be strictly temperate. Protestant preferred. Wages 60c per hour. Steady work the year around for the right man, with chance for advancement. Address–B–78, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 4–3t.

Wanted—At once good all around tinner and furnace man. Must also do plumbing. Must be good workman. $30.00 per week for 10 hours per day. Steady job the year around for the right man. Address–Chris Ehlinger, Vinton, Iowa. 4–3t.

Wanted—Tinner, who can also do plumbing and general repair jobs on farms. One who is willing to work on percentage basis. No capital, tools or truck required. Address Grant Park Hdwe. Co., Grant Park, Illinois. 5–3t

Wanted — A combination sheet metal, plumbing and heating man. 53 hours per week. Well equipped shop. Good Minnesota town. Address B–69, care AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois. 2–3t

Wanted—A first class furnace installer. Steady job year around for man who can qualify. High wages paid. Address Holland Furnace Co, Sheboygan, Wisconsin. 5–3t

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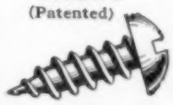

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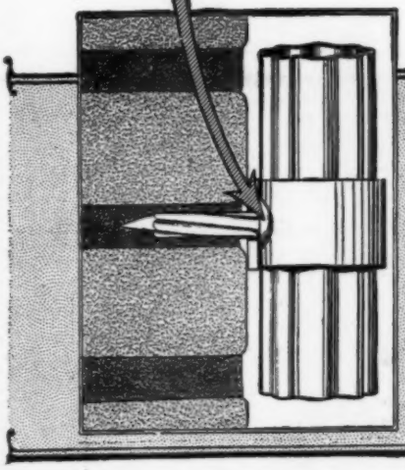

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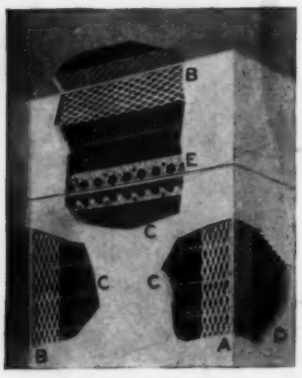

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